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COMPUTERWORLD

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Technology brings undersea world to kids on dry land. *Computerworld Smithsonian Awards* profile. Page 22.

SAA pep rally to be independents' day

BY ROBERT MORAN
and STANLEY GIBSON
CW STAFF

Next week, IBM will demonstrate that its Systems Application Architecture has been more than just a conceptual exercise.

In addition to announcing the much-anticipated SAA Office and OS/2 Extended Edition 1.2, IBM will have 13 independent software developers on hand to demonstrate SAA-compliant products, according to sources.

IBM would neither confirm nor deny the existence of SAA Office and OS/2 Extended 1.2 or the May 16 announcement date. However, an IBM spokesman said the company will soon announce software that will enhance "the productivity of workers throughout an enterprise or business, including executives, managers, professionals and their staffs." He added that IBM will also "announce applications that conform to SAA guidelines." SAA Office is expected to include office automation programs that run across multiple computers.

SAA — a series of software standards, communications protocols and interfaces — is IBM's method of providing portability and interoperability across its hardware platforms. The 13 third-party vendors reportedly will demonstrate their compliance with the Common User Access, an IBM standard that ensures a consistent look and feel for software from all the vendors.

Paul Hessinger, president of Computer Task Group, Inc., a consultancy based in Buffalo, N.Y., said that SAA Office's integrated features, which he has seen, "will begin to demonstrate the power of Presentation Manager's icon interface," the foundation for the CUA approach. OS/2 Extended 1.2 will supply significant advances in IBM and Microsoft Corp.'s OS/2 Presentation Manager, LU6.2 communications support and memory management that the SAA Office capabilities require, he said.

According to Paul DiBono, vice-president of marketing at American Software, Inc. in Atlanta, American Software's CUA implementation of its inventory control and accounting software "uses icons and pull-down screens instead of keys." Icons relating to inventory, for example, can be triggered by a mouse

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Software vendors at IBM's announcement

- American Management Systems (Financial)
- American Software (Inventory control, accounting)
- Arthur Andersen (CASE tools)
- Computer Associates (Accounting, data center management)
- Comshare (Decision support)
- Information Builders (Fourth-generation languages)
- Integral Systems (Human resources, payroll)
- Management Science America (Accounting, manufacturing)
- McCormack & Dodge (Financial)
- Policy Management Systems (Insurance)
- SAS Institute (Statistics, data analysis)
- Sterling Software (Configuration, storage management)
- Tesseract (Human resources)

Trane farms out processing as buyout debt forces cuts

BY CLINTON WILDER
CW STAFF

ST. LOUIS — Following the lead of debt-saddled parent firm American Standard, Inc., Trane Co. announced last week that it will cut information systems costs by contracting out nearly all of its mainframe data processing to a third-party vendor for the next five years.

Trane's $25 million contract with McDonnell Douglas Information Systems, also based here, includes data center operations and technical services but no development work. A small number of remaining Trane employees at three data centers will continue to schedule jobs, download the data processed by McDonnell Douglas and print reports.

New York-based American Standard is under severe pressure to cut costs and retire debt after its $2.5 billion management buyout, which was deployed as a hostile takeover defense last year. Gary Biddle, American Standard's corporate vice-president of MIS, said he saw contracting of processing cycles as a way to trim operations costs without disrupting IS strategy.

"We already had our computer centers running like a utility," Biddle said. "The lines of business were comfortable with remote job entry and not knowing where the black box was, so we

Continued on page 4

COMPUTER INDUSTRY

Is U.S. ready for Japan software push?

BY GLENN RIFKIN
and J. A. SAVAGE
CW STAFF

"The Japanese recognize their deficiencies quite clearly and have embarked on a massive effort to catch up."
Report on international competition in software from the U.S. Office of Technology Assessment

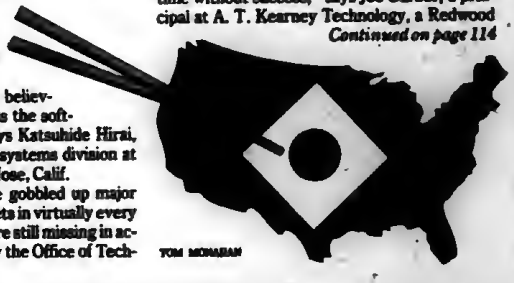
In Japan, software has become a *kino maru*, which means an issue of the flag, a matter of patriotism. "I'm a believer that the one who controls the software controls the war," says Katsuhide Hirai, director of the information systems division at Fujitsu America, Inc. in San Jose, Calif.

The Japanese, who have gobbled up major portions of worldwide markets in virtually every aspect of high technology, are still missing in action in software. A report by the Office of Technology Assessment said Japan's software industry resembles that of the U.S. two decades ago — "small and not very visible."

However, this appears to be changing. Several Japanese companies are in the midst of establishing software development teams in the U.S., and equity investments in U.S. software houses by Japanese firms are not far off.

"They've been chasing this for quite a long time without success," says Joe Garber, a principal at A. T. Kearney Technology, a Redwood

Continued on page 114



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Quotable

"Calisthenics at dawn doesn't fly in the software industry."

DAVID TORY
OPEN SOFTWARE FOUNDATION

On the difficulties of applying Japanese corporate culture to software development. See story page 1.

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UPDATE

Rotten to the core. That's pretty much the conclusion reached in a landmark two-year study of U.S. manufacturing, hatched by a very elite group of industrial theorists and other experts at MIT. Our industry is shackled by short-term thinking, the study concludes. It's bound by allegiances to old manufacturing methodologies that used to be successful. It's exporting leading-edge technologies to our competitors. And U.S. universities are training our competitors' skilled labor force. Meanwhile, our public education system languishes. It's getting tougher to have a nice day.

Unattended operations provides food for thought, but it's not here now, says John Bjelland. Page 91.

Adapso's Alice Denson issues software industry warning. Page 1.

PHOTOS — TOP: MARCELLO PAGANELLI/WOODFIN CAMP. BOTTOM: ALVIS UPITIS

EXECUTIVE BRIEFING

■ **'Lights-out' means dim, not dark.** The concept of a totally unattended data center is not being embraced by most managers, who are busy using automation tools on pressing, everyday concerns such as cost control. Managers who have tried some level of unattended operations are experimenting with it during night shifts and weekends. But lights-out may become a business necessity some day, and managers must do right by employees if they want to make it work. **Page 91.**

■ **IBM's first SAA-based applications** will debut next week, about two years after the company originally announced its SAA, designed to break down the incompatibility boundaries between the company's diverse platforms. Thirteen independent software developers will also introduce SAA-related products as IBM rolls out SAA Office and OS/2 Extended Edition 1.2. **Page 1.**

■ **IBM was one of many vendors** making announcements at the International Communications Association show. IBM sought to integrate its MVS-based applications with voice-oriented traffic. MCI said it will launch its ISDN strategy with a bridge that protects users' equipment investments. MCI, U.S. Sprint and IBM all lined up behind fractional T1. **See stories page 140.**

■ **Striving to cut information systems costs,** Trane farmed out mainframe processing to McDonnell Douglas Information Systems under a five-year, $25 million contract. The heating and cooling equipment maker was following the lead of its parent company, American Standard, which recently contracted out many of its IS operations in a bid to retire debt. **Page 1.**

■ **MSA is a mainframe software company.** That will be the chorus sounded by Management Science America to the MSA user group next week. After failed ventures in such fields as PC software, MSA is once again counting on its traditional strength — mainframe applications. **Page 8.**

■ **The most recent release of IBM's DB2** relational DBMS offers some support for referential integrity. This feature may rightly be seen as a major step forward in database management. It's worth asking, however, what impact this new capability will have on those IS departments currently using or planning to use DB2. **Page 103.**

■ **Federal managers must be clever** to work around the government's low pay schedules and outdated policies if they are going to maintain a qualified IS staff. **Page 78.**

■ **The most sought-after IS executives** are those in the financial services industry. But demand is down for IS managers in other fields such as manufacturing, publishing, transportation and utilities, according to a search-firm study. **Page 75.**

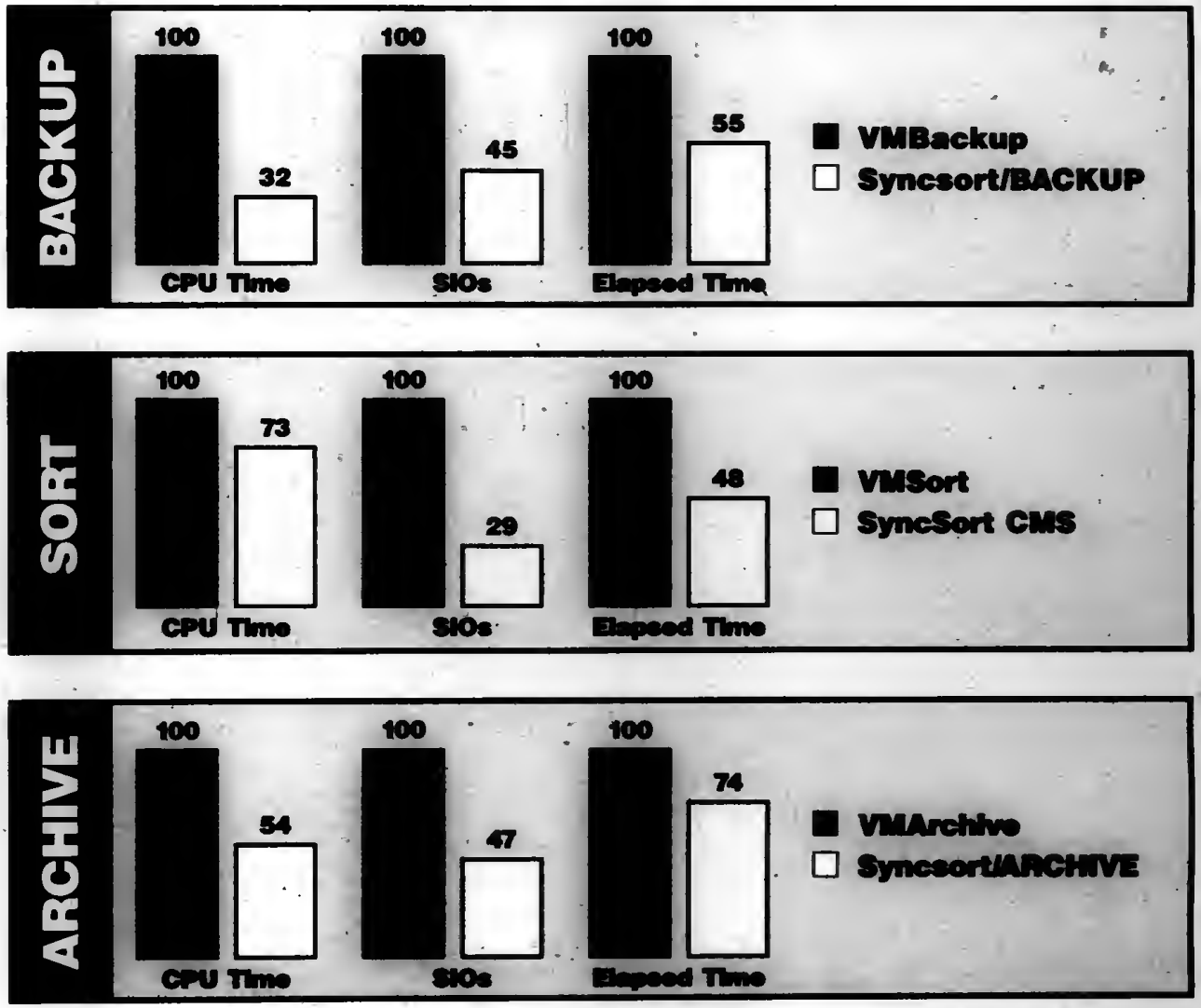
■ **Users can save money** by routing X.25 packet-switched transmissions over Integrated Services Digital Network B channels, as proven by West Virginia University. **Page 63.** Meanwhile, a Utah telemarketer is looking outward to optimize its ISDN investment. **Page 63.**

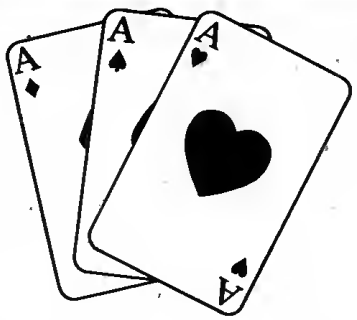
■ **Lower prices** are drawing previously reluctant MIS managers toward third-party suppliers of IBM 3090 mainframe memory. **Page 29.**

■ **The Next machine is a hit** among users on the Stanford University campus, but the challenge of learning to program on that Next workstation has some students looking forward to summer vacation. **Page 43.**

■ **Joining the ranks of CASE advocates** is a Virginia-based health insurer's IS spin-off. It is counting on computer-aided software engineering tools to blend the flexibility of PCs with the power of mainframes as it builds application portfolios for clients. **Page 31.**

VM PERFORMANCE FROM SYNCSORT





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Users fed up with AS/400 tape delay

BY ROSEMARY HAMILTON
CW STAFF

When it comes to tape backups, some IBM Application System/400 users think they are getting a raw deal from IBM.

With alternative solutions few and far between, users said they are stuck in a no-win situation until IBM — or another company — finally comes out with an adequate tape subsystem.

"We're getting by, but it's not pretty by any means," said Rick Pinkos, a vice-president and manager of technical services at D'Arcy Masius Benton & Bowles, Inc., an advertising agency in Bloomfield Hills, Mich.

The source of users' woes is the IBM 2440, a relatively slow tape drive based on older reel-to-reel technology that currently serves as the high-end tape drive for AS/400 users. IBM introduced this drive as an interim solution for AS/400 users last year. A faster tape drive, the 3422, will not be adapted for the AS/400 platform until the fourth quarter. Users can buy the 2440 now and get rebates once the 3422 is available.

But users said that plan is not good enough. Not only is the 2440 giving them headaches, but the 3422, which is also a reel-to-reel system, will not solve their problems either, they said. What they want is newer 3480-type technology currently used by IBM mainframe shops, which would give them much faster data transfer rates and a tape cartridge-based system.

Last week, an IBM spokesman refused to spell out IBM's plans but said the company "is aware, and we understand the customers' needs, and we're working to meet them."

So users, particularly those running high-end models that can manage multiple gigabytes of data, are searching for ways to make do. Some are digging their heels in with IBM and using methods that work around the IBM solution. One such technique is journaling, a process that backs up only changes made to data rather than complete files. But some users hope that other vendors will come through.

A possible alternative

One that recently emerged with a possible tape drive alternative is Houston-based Universal Computer Systems, Inc. Last week, a spokesman said the company is a month behind schedule in delivering its cartridge-based tape drive for the AS/400 but plans to begin shipments next month.

"We're ready to try them because IBM just hasn't come out with a decent solution yet," said Joseph Voloshin, a technical support manager at Adventist Health System West in Roseville, Calif., which operates 17 hospitals on the West Coast.

Voloshin oversees a 12-unit AS/400 installation, and he reports that backups now take twice as long as they did with IBM System/38s, which the AS/400s replaced. Furthermore, Voloshin said he is unable to do unattended backups, which can be performed by many cartridge-based systems.

The 2440 requires that an operator change the tape each time it is filled to capacity, which is about every 200M bytes of data. With a cartridge-based system, several tapes can be automatically loaded without an operator's assistance.

The Universal Computer tape drive will reportedly offer a data transfer rate of 256K byte/sec. — not much of an improvement over what IBM now offers. But Voloshin said the cartridge-based technology is enough of a reason to go with this product.

James Matsey, corporate director of information systems at Reynolds Metals Co. in Richmond, Va., is also hoping other vendors will come out with alternative drives.

"I want at least some kind of channel-connect, so I could hook up a competitor's product like the Memorex-Telex 5461," Matsey said. "I don't want a 3420. I want cartridges."

On hold

IBM AS/400 users are upset but getting by as they wait for an interface to the 3422 tape drive

	2440	3422
• Dual-density data transfer rate:		
at 1,600 byte/in.	120K byte/sec.	200K byte/sec.
at 6,250 byte/in.	469 byte/sec.	780 byte/sec.
• Tape speed	75 in./sec.	125 in./sec.
• Unit price	$28,350	$48,875
• AS/400 subsystem attachment	$3,150	$6,615
• Availability for AS/400	Now	Fourth quarter

CW CHART: JOHN POWERS

Fly in the ointment

The AS/400 tape drive has become IBM's one big flaw in an otherwise successful product line, observers said last week.

Dave Andrews, president of ADM, Inc., a consulting firm in Cheshire, Conn., said he expects IBM to announce plans for a high-speed cartridge-based tape drive by year's end to prevent competitors from gaining any ground here. But Jay Bretzmann, an analyst at International Data Corp. in Framingham, Mass., said he believes IBM is too busy with mainframe storage projects to address the AS/400 problem this year.

IBM has not fully explained why it did not release a more advanced tape drive when the AS/400 made its debut last year. Yet observers say the problem started with an unsuccessful alliance with Cipher Data Products, Inc. The two firms were reportedly working on an advanced tape drive for the AS/400, and while neither company ever confirmed that technical problems cropped up, that has been the industry speculation.

Bretzmann said he believes IBM put aside plans for adapting the 3422 to the AS/400 because the Cipher project would have resulted in a superior product. Then, when the Cipher deal disintegrated around the time of the AS/400's introduction, IBM had to find a suitable offering. With so little time to work, the 2440 was offered as an interim solution.

ROSEMARY HAMILTON

Trane

FROM PAGE 1

asked, 'Can we buy the services outside for a lower price?' I am surprised more companies haven't done it yet."

American Standard closed its Piscataway, N.J., data center and farmed out most of its mainframe processing to Pittsburgh-based Genix Enterprises, Inc. in the first quarter [CW, April 17].

Last Trane to Clarksville

American Standard eliminated 27 of 35 data center jobs at Piscataway, roughly the same number that Trane will cut, in total, from data centers in Tyler, Texas, La Crosse, Wis., and Clarksville, Tenn.

Trane's contract includes all of its business, financial and manufacturing applications. McDonnell Douglas said it will initially duplicate the processing environments of the three Trane data centers, then begin next month to convert applications to the same releases to consolidate all of Trane's processing.

Biddle said that Trane and American Standard each expect to save about $2 million per year in operations costs from the respective contracts. "But the cost avoidance could be much higher," he said. "I won't have to buy chunks of processing capacity that will sit unused. I can buy another 10 hours [of processing] instead of another mainframe."

The strategy has risks, said Dudley Cooke, a former IS executive who now heads Executive Insight Group, a consultancy in Bryn Mawr, Pa. "It sounds good up front, but you may be losing some flexibility and security," he said. "You're essentially buying someone else's risks. Those risks may be tolerable, but you have to understand what they are."

Genix handles all of American Standard's IBM MVS-based processing in the U.S. and Canada, which includes applications for corporate headquarters, the plumbing supplies business and the Wabco brake equipment unit. Biddle said he is studying outsourcing possibilities for the firm's European operations.

CORRECTIONS

The photograph of John Cullinane [CW, May 1] was taken by Seth Resnick.

The telephone number for Techland Bluelynx in Friendsville, Md., was incorrectly listed in the New Products section [CW, April 24]. The correct number is 800-832-4526.

The chart that appeared in the Product Spotlight section [CW, March 27] covered back-end tools only and should have been headlined as such.

IDC Financial Services Corp. expects a replacement for the IBM 4245 Model 20 band printer to print 2,000 to 2,500 line/min, not 2,000 to 5,000 line/min as reported in the Marketplace column [CW, Feb. 27].

COMPUTERWORLD

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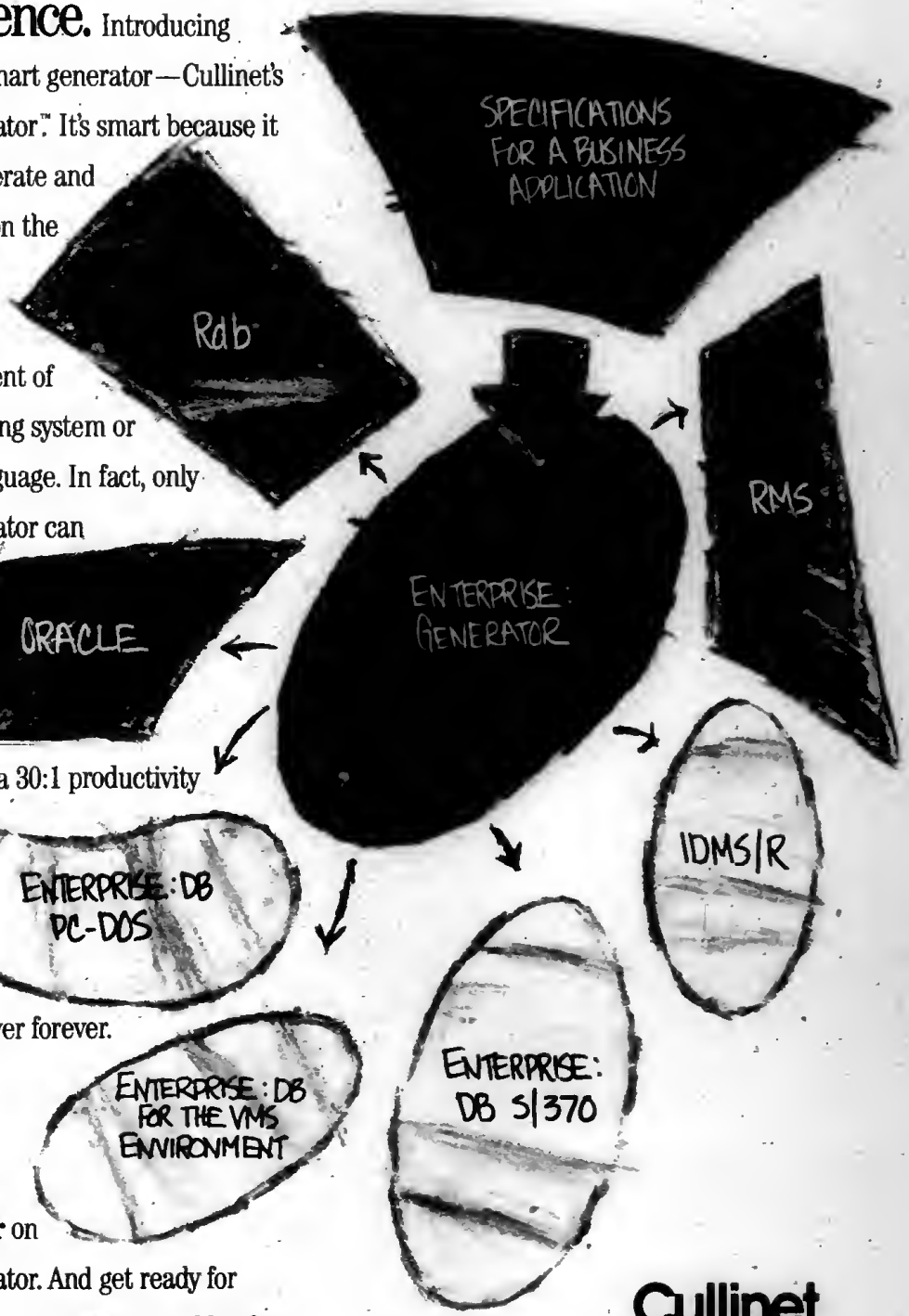

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NEWS SHORTS

IBM buys into interface vendor

Less than a month after IBM Chairman John Akers praised the firm's strategy of taking ownership positions in entrepreneurial companies with compelling technologies, IBM signed a development/licensing agreement with Interactive Images, Inc., a personal computer-based graphical user interface technology vendor. IBM will acquire a minority stake in the privately held company.

OSF releases specifications

The Open Software Foundation last week released to members specifications of its upcoming OSF/1 offering, which includes the OSF Unix-based operating system and the Motif user interface. Members will provide feedback at a meeting later this month. The consortium also disclosed availability dates for OSF/1, which will be released in stages beginning in October.

Benchmark cooperative sets plans

The Systems Performance Evaluation Cooperative (SPEC), a group of computer manufacturers led by Hewlett-Packard Co., Sun Microsystems, Inc., Mips Computer Systems, Inc. and Digital Equipment Corp. — and now IBM — will release a suite of benchmarks to measure performance of computer systems more accurately. Release 1 of the SPEC Benchmark Suite will consist of currently used Unix benchmark tests approved by the consortium. Although the group's goal is to address business applications, the first release will target technical computing.

Eavesdropping ban filed

A bill to prohibit employers from secretly monitoring employee computer terminals was introduced last week by U.S. Rep. William L. Clay (D-Mo.) and others. The bill, supported by the Communications Workers of America, is intended to prevent abuses of electronic monitoring in the workplace.

Council to study computer crime

At the request of the U.S. Defense Advanced Research Projects Agency, the prestigious National Research Council has formed an expert panel to study computer crime. The study, which will focus on solutions, research progress and public policies, is slated for completion by late 1990. The panel is chaired by David D. Clark, a senior research scientist at MIT.

Tax returns on tape

The Internal Revenue Service announced last week that it will allow companies to file tax returns for employee pension plans by sending magnetic tape rather than paper forms. The IRS said magnetic tapes of Forms 5500-C and 5500-R will be processed at the service center in Andover, Mass. For more information, call 508-474-9441.

Valcom offers connectivity service

Omaha-based retailer Valcom, Inc. has opened a research center to test connectivity options for customers nationwide. Testing is said to include PC-to-PC local- and wide-area networks, as well as gateways from PCs to mini and mainframe hosts. The center is currently testing solutions using Ethernet, Token-Ring and Arcnet with products from 3Com Corp., IBM and Novell, Inc.

Microsoft ships Word products

After months of delays, Microsoft Corp. finally finished updates of its Word line of word processors for IBM and Apple Computer, Inc. Macintosh PCs. Microsoft, which felt the fallout of further Word delays in an alarming $8.50 per share stock drop in March, said it will begin shipment this week of Word 5.0 for the IBM Personal Computer to users requesting updates. Microsoft started shipping its Word 4.0 update for the Macintosh two weeks ago.

Stellar juices graphical supers

BY JAMES DALY
CW STAFF

BOSTON — Stellar Computer, Inc. intensified its campaign to make the graphics supercomputer an integral part of the scientific community last week by rolling out a family of machines that provide up to 75% more performance than their predecessors but at similar prices.

The unveiling of the five-member GS2000 series only slightly shortchanges a pledge President and Chief Executive Officer John William Poduska made at the GS1000's coming-out party last March, when he promised a model twice as powerful but costing the same as the GS1000 within a year.

The GS2000 graphical supercomputer and DS2000 multiuser departmental supercomputer sustain up to 35 million instructions per second (MIPS) and 100 million floating-point operations per second (MFLOPS) compared with the GS1000's 20-MIPS and 40-MFLOPS rating, the firm said. The GS2000 will start at $125,000 and be available in the fourth quarter.

Stellar said the GS1000 will remain as an entry-level product and recently cut its price from $104,000 to $90,000.

Although graphical supercomputers promised to hurdle the high-end workstation market and make the personal supercomputer a reality, they have undergone a stormy freshman year. A lack of wide-ranging software, networking bottlenecks and a premium price tag have made the job of drumming up a niche market a slippery task.

Some analysts said Stellar did not go far enough in addressing the cost problem. "Their price/performance levels should be much more aggressive," said Ajit Kapoor, senior vice-president at CAP International, Inc., a Norwell, Mass., research firm. "High-end workstations are now priced at $1,000 per MIPS."

Still, some say the graphical supercomputer provides essentials that no workstation can offer. Carey Floyd, assistant professor at Duke University, said he is sold on Stellar's FLOPS rating, which measures math operations; the floating point is the shifting of the decimal point so it appears in the same place in all numbers, thus easing the computer's work.

"Floating-point performance is crucial. The new workstations produced by DEC and Sun don't even come close," Floyd said.

Arts and graphs

Stellar's product line drives graphics supercomputing prices as low as $70,000 per user

Model	Performance	Base price
GS2500	35 MIPS, 100 MFLOPS	$140,000
GS2000	20-25 MIPS, 80 MFLOPS	$125,000
GS2200	Same as GS2000 but supports two users	$140,000
GS1000	20-25 MIPS, 40 MFLOPS	$90,000

SOURCE: STELLAR COMPUTER INC. CW CHART: JOHN YORK

SQL Server released; still waiting for tools

BY DOUGLAS BARNEY
CW STAFF

Sixteen months after its announcement and two days before its revamped April 30 deadline, the Ashton-Tate/Microsoft SQL Server has finally reached the hands of waiting users.

Still missing, however, are critical front ends such as Ashton-Tate Corp.'s Dbase IV, Lotus Development Corp.'s 1-2-3, Sybase, Inc.'s graphical tools and Borland International's Paradox. It also lacks effective support of Cobol and Fortran.

The absence of end-user-oriented applications, programming languages and application development tools will hold up SQL Server at many MIS shops, users said last week.

SQL Server's customers did, however, get support for the C programming language. Conventional languages are technically supported, but SQL Server requires many programming conventions tailored for C, according to Dave Kaplan, SQL product manager at Microsoft Corp. This makes for an awkward transition for Cobol-oriented MIS professionals.

"We are not much into writing our own C language programs," said Allen Head, director of information services at Universal Flavors Corp.

Early SQL Server users such as System One Airplane Services and Bank of Canada are writing custom applications rather than tying in productivity tools or shifting over Cobol-based systems, Microsoft said.

Others intend to wait. "There are a lot of things that are missing, mainly the front ends and language support such as a PC version of Cobol," said Patrick John Lee, data processing manager at Townecraft, Inc. in Glen Rock, N.J. Like many, Townecraft is "heavy into Cobol," he said. However, Lee is anxious to get cracking with SQL Server, which may wean the firm from its two Digital Equipment Corp. VAX-11/750s.

If all goes well, baseball fans will have Dbase IV ask SQL Server for information on some 100,000 baseball artifacts at the Baseball Hall of Fame and Museum in Cooperstown, N.Y. The museum's MIS chief, Patrick J. Rooney, said he would prefer to use Dbase to develop that application if it stands up. If not, he said he is likely to use C. In either case, Rooney will wait for the pieces to come together, he said.

Within 30 days, Century 21 Real Estate Corp. is to begin testing SQL Server on a local-area network. The only front end that Director of Computer Operations Richard Goward is interested in is Dbase IV. However, he will have to wait until this summer to test Dbase. "It will slow things, but our production work continues," Goward said.

One vendor warned against high hopes. "Users are expecting a lot from the client/server, but there is a question as to what they will get from the first version. A lot of users may be disappointed," said Arun Gupta, president of Dataease International, Inc.

Gupta pointed to performance problems arising from translating queries from the older-style clients to the SQL back ends, a lack of effective integration and the lack of distributed database capabilities as factors that are liable to turn off users.

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MSA restates mainframe focus

Seeks return to stability after period of unbridled growth, money woes

BY AMY CORTESE
CW STAFF

ATLANTA — After three years of persistent financial troubles, a series of fitful project starts and stops, a tumultuous transformation in its core market and one big spurned takeover bid, Management Science America, Inc. will face 4,000 users next week and declare, "We are a mainframe software company."

That is an unusual thing to hear at a time when practically every traditional software company is scrambling to find niches on alternative computing platforms. But for MSA, it may be the path back to the stability it once enjoyed when it was the industry's largest independent software vendor.

MSA's Imlay *aims to focus the core business*

After flirting with moves into markets such as personal computers and Digital Equipment Corp. VAXs, MSA has refocused its efforts on its traditional business of IBM mainframe application software and shelved projects not in compliance with IBM's Systems Application Architecture (SAA).

"We could not afford to pursue all of these," said Bill Evans, MSA's chief financial officer.

MSA Chairman John Imlay "is doing a good job of refocusing on the core business," said Gary Biddle, vice-president of information systems at American Standard, Inc., an MSA account.

After years of acquisition and uncontrolled growth, MSA was hit hard by the slowing of the mainframe market. Last August, Imlay returned to the helm, requesting the resignation of former President William Graves, who had run the day-to-day operations since 1980. "The company was not performing financially; we needed to take some quick, decisive moves," Imlay said in a recent interview.

Operations were consolidated abroad as well as at headquarters. MSA's two major divisions, manufacturing and nonmanufacturing software — which had operated as two distinct and often opposing empires — were combined under Executive Vice-President Douglas MacIntyre.

As part of the restructuring, employee head count was reduced from 2,700 at the end of 1987 to less than 2,400 at the end of 1988. As a result, MSA took a $35 million charge against expenses last year.

Biddle cautioned that whenever a firm undergoes that kind of change, it is bound to affect customers. "There will probably be a lot of criticism at Interact," MSA's user group conference, which opens next week.

A lot of loyalty

But MSA's roughly 7,500 customers have traditionally been a loyal lot. Matt Perri, director of information systems at BASF Corp. and a longtime MSA customer, echoed the sentiments of many users. "MSA had some natural growing pains and ran into serious organizational problems," he said, adding that MSA has moved to correct those problems and that he is positive about the company's direction.

MSA's $2.3 million profit for the first quarter surprised and encouraged analysts, who had expected a slight loss. The results "reflected an extraordinarily successful effort by MSA management to get expenses under control," said Ken Burke, an analyst at Alex Brown & Sons.

MSA has perhaps the most at stake in the success of SAA, IBM's blueprint for hardware transparency. The firm has dropped efforts that were under way on systems software in favor of a development focus with SAA as its architecture.

Imlay acknowledged that SAA has some holes in it but said these will be filled over time. The recent introduction of Brightview — PC software that simplifies mainframe access for users — was hailed as one of the first products to incorporate SAA common user access. However, MSA may lag behind other vendors, who will move quickly to incorporate not only the common user access but LU6.2 communications as well. MSA is one of several vendors expected to participate in IBM's SAA Office announcements next week (see story page 1).

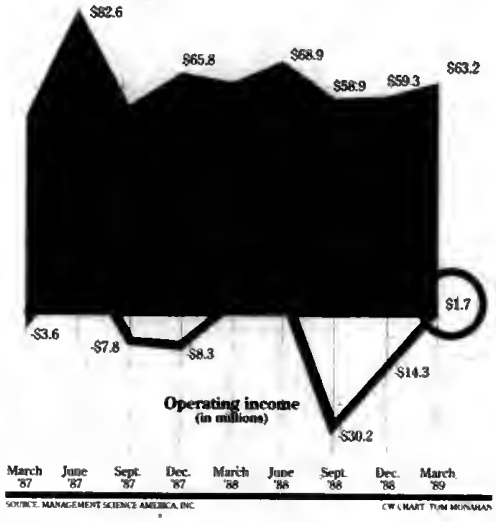
MSA plans to implement SAA specifications over the next few years, including LU6.2, which is necessary for cooperative processing. Brightview will be brought to OS/2 by year's end, the firm said. And so far, only the General Ledger product has been retooled to work with DB2, a critical piece of SAA, although other application packages are also being redesigned.

MSA's financial troubles prompted a takeover attempt by Computer Associates International, Inc. last year. CA finally withdrew after shareholders backed Imlay in rebuffing the $11-per-share offer.

MSA is still the object of takeover speculation and rumors. Imlay does not deny that, saying, "Everyone has a deal. I've had a call from them all." But he said he intends to return MSA to its former growth rates on its own.

Turnaround time

MSA's first-quarter results show a return to profitability



SOURCE: MANAGEMENT SCIENCE AMERICA, INC.
CW CHART: TOM MONAHAN

SAA

FROM PAGE 1

that will generate a series of messages that execute transactions. DiBono said that the visual, as opposed to textual orientation will quicken interactions.

The announcement may represent a rebirth of sorts for the traditional mainframe software vendors that will be represented in force. By adopting SAA, these companies are able to divide their applications between the mainframe and the workstation — a tack taken by Management Science America, Inc., when it announced its Brightview product line last fall.

But the initial SAA implementation carries hefty expenses. For example, Richard Crandall, president of Comshare, Inc. in Ann Arbor, Mich., which has cooperative processing with its Commander Executive Information Systems (EIS), reported that the company "has spent $5.5 million to bring its product into compliance with SAA."

Crandall said the expense pays off because if a software vendor follows CUA guidelines, business professionals can move from one piece of on-screen software to the next without experiencing screen shock. "It is like going from car to car — there is enough similarity that you can drive it right away," he said.

Barbara Johnson, product manager for HRMS Intuition, a new coprocessing implementation from Tesseract Corp. in San Francisco, confirmed that the firm would introduce its product at the IBM press conference on May 16. She said HRMS screens will look different from a 3270 environment because Tesseract has taken advantage of CUA.

"Employee information is graphically represented using presentation objects," she said. "These presentation objects symbolize familiar hard-copy personnel records, appearing as file folders and 3- by 5-inch index cards." She confirmed that IBM 3270 screens in the initial stages will coexist with the icon-based screens.

The endorsement of mainframe vendors makes sense for IBM as well. "If IBM wants to further the SAA cause, it clearly has to look to the large applications vendors," said Sanjay Kumar, vice-president of product planning at Computer Associates International, Inc. in Garden City, N.Y. "IBM can get the most bang for the buck from appucations that run on the personal computer, the Application System/400 and the 370." Kumar would not confirm CA's involvement in the announcement.

Hessinger, adding that IBM is ready to ramp up SAA, likened the forthcoming announcement to the ramp-up of DB2. "It is a very well-thought-out release program, with a well-architected direction," he said.

Class of SAA on display

Independent software developers will demonstrate their implementations of IBM's SAA next week, showing the fruits of an IBM Study Program that began well over a year ago.

Tesseract will introduce HRMS Intuition, which the company touts as the first full SAA-cooperative processing workstation on the market. According to Barbara Johnson, product manager for HRMS Intuition, the new product exchanges information between a mainframe and a Personal System/2 workstation using LU6.2 message support and LU2 communications. Application logic and processing are both being distributed between the mainframe and the workstation.

American Software, Inc.'s first SAA announcement will be its Inventory Control and Accounting software product, which uses IBM's DB2 and the Common User Access (CUA) on an IBM PS/2, according to Paul DiBono, vice-president of marketing. DiBono would not confirm his company's involvement in the SAA announcement but said the revamped application will run on all IBM 370 platforms. In addition, the company will implement CUA in the AS/400 environment and in the DB2 SQL.

Comshare's Commander EIS, a cooperative processing workstation for executive information systems, will be enhanced to include a native implementation in IBM Presentation Manager and will have an interface to IBM's Professional Office System, according to Richard Crandall, Comshare's president. Brian Cohen, vice-president of technology and research at Management Science America, would not confirm the company's involvement in the announcement but said Brightview, the cooperative processing version of the company's application line, is just the first step toward the development of SAA products.

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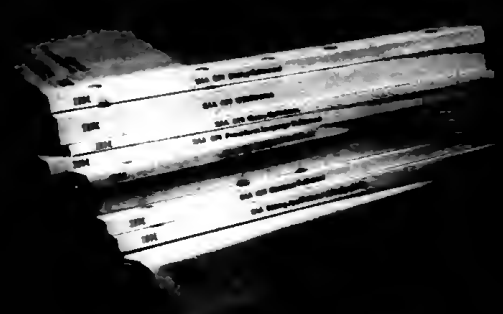

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1-IBM Journal of SAA 2:DATAPRO survey, August 1988, companies with sales over $10 million 3:Donaldson, Lufkin & Jenrette report

AT&T, MCI yield to X.400 pressure

BY ELISABETH HORWITT
CW STAFF

Bowing to heavy pressure from powerful user organizations, AT&T and MCI Communications Corp. have both announced that their electronic mail services will be able to exchange messages with Telenet Communications Corp.'s Telemail service using the X.400 standard. However, AT&T and MCI users still have no way to exchange messages with one another.

While U.S. E-mail service vendors have announced a number of X.400-based connections with private host-based messaging systems and with international carriers, links between two domestic carriers are a recent phenomenon. Earlier this year, AT&T and MCI announced similar links to Dialcom, Inc.

"This has been needed desperately for a long time. How much would you give for a telephone service if you couldn't talk to everyone who uses one?" said Walter Ulrich, a partner at Coopers & Lybrand.

In 1989, approximately 800 million messages will be exchanged over E-mail services, Ulrich predicted. Intervendor connections should fuel growth of 25% to 30% next year, as compared with 20% to 25% growth during the past few years, he added.

The General Services Administration (GSA) and the Aerospace Industries Association (AIA) both acted as major catalysts in this latest joining of hands among rivals, vendor spokesmen said.

Only X.400

Last December, the AIA announced that its members would limit their purchases of private and public E-mail systems to only those products that could interoperate using X.400. To encourage further vendor cooperation, the AIA initiated a pilot project for establishing interoperability among major messaging service providers.

"We are pleased, heartened and gratified that it's all coming together," said Steve York, manager of information exchange technologies at pilot site Hughes Aircraft Co. "We hope the other vendors will provide interoperability soon." Hughes plans to use X.400 as soon as possible to link up with customers, suppliers and teaming partners on contracts, York said.

The GSA also made X.400 interoperability a prerequisite for providers for the giant FTS-2000 contract to network all of its agencies, according to Michael Corrigan, deputy commissioner for telecommunications services. "This [agreement] is what we wanted to see," Corrigan said. AT&T holds 60% of this contract; Telenet parent U.S. Sprint Communications Co., 40%.

> "UP UNTIL RECENTLY, X.400 interconnection was something vendors thought of as, 'Gee, that's a good idea, we'll do it sometime.' "
>
> JOHN SHERBURNE
> TELENET

The GSA is currently using a Telenet network and plans to use the X.400 connection to communicate both internally and with vendors during the transition period, Corrigan said.

All government organizations that plan to adhere to the Government Open Systems Interconnect Profile specifications are planning to implement X.400, he added.

"The AIA and GSA pulled things together faster than they might otherwise have gone," said John Sherburne, director of Telemail services.

"Up until recently, X.400 interconnection was something vendors thought of as, 'Gee, that's a good idea, we'll do it sometime,' " he said.

AT&T and MCI have no current plans to interconnect their electronic messaging services, AT&T product manager Marilyn Sorrentino said.

Cross those fingers

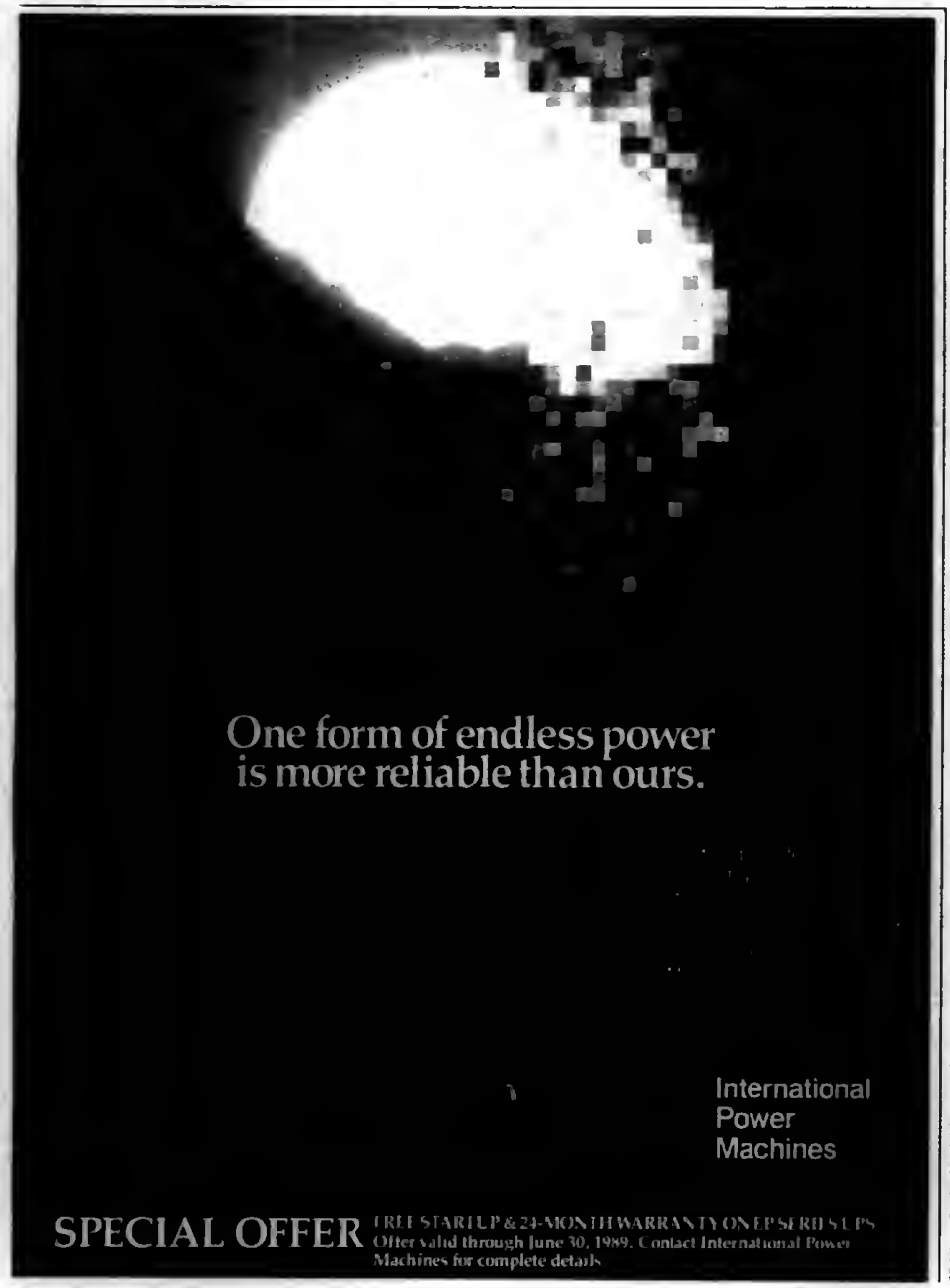
None of the three vendors currently offers a standardized directory service based on the X.500 standard.

An X.500 directory service would automatically keep track of E-mail users across multiple providers, which would make it possible to send messages without having to manually key in the address and system where the recipient's mailbox resides.

The AT&T-to-Telenet X.400 connection is available now; the Telenet-to-MCI connection is scheduled for availability this summer.

Telenet announced that X.400-compliant systems from the following vendors have been certified to access Telemail: Hewlett-Packard Co., Soft-Switch, Inc., Wang Laboratories, Inc. and Xerox Corp. Telenet also introduced X.400 connections to Belgium, Sweden and Australia.

In addition, AT&T announced AT&T Mail links to E-mail services in Korea, Sweden, Australia and Finland.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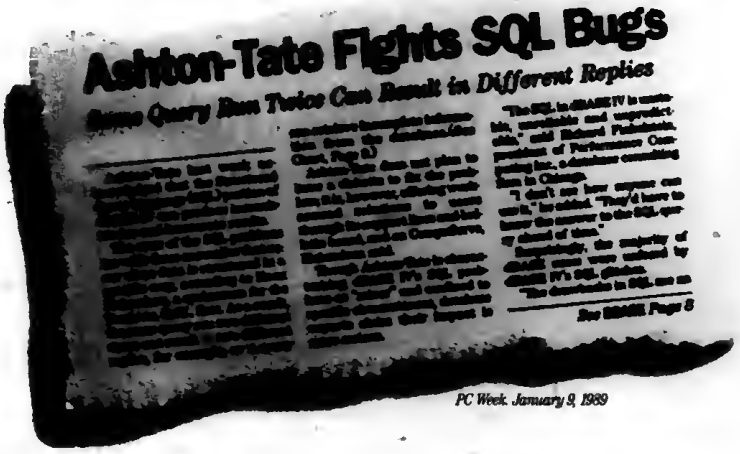
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Federal government weighs laptop ban on U.S. airplanes

BY MICHAEL ALEXANDER
CW STAFF

WASHINGTON, D.C. — Executives who are accustomed to using laptop computers to take care of business when they travel may be in for a rough ride if the U.S. government goes ahead and bans laptops and other electronic gear from the cabins and cargo holds of U.S. commercial airplanes.

Last week, the U.S. Department of Transportation (DOT) said that it is studying a proposal to ban electronic devices and other unnamed options in response to the Dec. 21 bombing of a Pan Am airliner. Officials believe that Pan Am Flight 103 was blown up by a plastic bomb hidden in a radio-cassette player while over Lockerbie, Scotland.

"We are looking at a program that would guarantee the safe carriage of electronic devices. A total ban is an option we have to look at, but there are other things that we're investigating as well," DOT spokesman Bob Marx said.

Marx said the program is being developed jointly with European countries. However, he said, no further details — such as the nature of the alternative strategies and the timetable — are available.

Several corporate laptop computer buyers said a ban would undoubtedly hinder their executives who use laptop computers as well as cause them to rethink their laptop computer buying plans, at least for users who want the devices to conduct business while traveling.

"It would definitely put a crimp in my plans," said Ron Goldfarb, new technologies manager at Pratt & Whitney Corp. in Hartford, Conn. The firm intends to expand its use of laptop computers and plans in a few weeks to launch a pilot program that will enable company officials to send and retrieve electronic mail messages while away from the home office.

Converse, Inc. in North Reading, Mass., has purchased 93 Zenith laptop computers for its national sales force in the past year and intends to buy 30 to 40 more for members of its international sales staff. A ban on carrying laptop computers on airlines would "certainly cause Converse to alter its buying plans," said Peter Durkee, a senior systems analyst at the company.

Laptop computer makers do not appear concerned that a ban would cut into sales of the devices. They say the vast majority of buyers do not travel widely with laptop computers but are more apt to use the machines in a relatively small geographical territory and travel by car.

Transportation Secretary Samuel K. Skinner raised the issue briefly two weeks ago on a trip to Europe and reiterated his views at a speech in Washington, D.C., last week. In the speech, Skinner said the U.S. and other countries are examining "how to check items such as computers, radios and so on. A total ban of all such items on airplanes is an option we have to consider, but if we can develop a plan for increased passenger safety without banning these items — and I believe we can — we will try to do it."

"At the same time," he added, "we will not compromise safety for the sake of expediency."

Senior Editor Douglas Barney and Washington, D.C., bureau chief Mitch Betts contributed to this story.

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Sprint planning trans-Atlantic fiber services

DALLAS — Last week in Bermuda, the final splice was made in the Private Transatlantic Telecommunications cable, known as PTAT, linking the U.S. and European ends of the fiber-optic pipeline and setting the stage for competition with the only other trans-Atlantic fiber cable, TAT-8.

To mark the event, PTAT co-owners U.S. Sprint Communications Co. and the UK's Cable and Wireless PLC introduced an extension of Sprint's Virtual Private Network (VPN) service to UK customers. International VPN is the first product of the two companies' Global Fon marketing alliance.

Sprint President Bill Esrey said International VPN will be unique because it will offer all-digital, software-defined networks and because sales and customer support will be coordinated on both sides of the Atlantic.

Gordon Owen, deputy chief executive of Cable & Wireless, charged that "TAT-8 continually goes wrong" and that PTAT will be a more reliable facility.

TAT-8 has experienced three outages since becoming operational last December.

International VPN will be available next April and will be offered in the U.S. by Sprint and Cable & Wireless' U.S. subsidiary, Cable & Wireless Communications, Inc.

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NAS gives Hitachi a U.S. label to wear

BY JEAN S. BOZMAN
CW STAFF

SANTA CLARA, Calif. — Hitachi Ltd. and Electronic Data Systems Corp. (EDS) finalized their joint-venture purchase of National Advanced Systems from National Semiconductor Corp. last week, making Hitachi a direct seller of mainframe products to U.S. customers for the first time.

"This move puts NAS on a more equal footing with Amdahl," said Bob Djurdjevic, president of Annex Research, Inc. in Phoenix. "They have the tools and the technological base from Hitachi and the value-added capabilities of EDS. If they put it all together smartly, not only will Amdahl be concerned, so will IBM."

The joint venture, called Hitachi Data Systems Corp., will continue to sell mainframes and peripherals under the NAS label, said company spokesman Chuck Mulloy. The new entity will compete with Amdahl Corp., in which Hitachi rival Fujitsu Ltd. holds a 49% stake. Both companies sell IBM-compatible mainframes and peripherals.

Hitachi, a $50 billion industrial giant, and $5 billion EDS will jointly manage Hitachi Data Systems, but five of the six board members will be Japanese. The board will oversee the activities of the NAS management team, headed by Gary B. Moore, a former EDS executive who is now NAS' president. Moore replaces David N. Martin, who had been with NAS since its inception in 1979 and had been the firm's president since 1983. Martin will not hold a position with the new firm, according to a company statement.

Hitachi owns 80% of the shares in the joint venture; the other 20% is owned by Dallas-based EDS, which is a division of General Motors Corp. EDS will provide systems integration expertise, but the role of value-added features within the NAS product line has not yet been determined, Mulloy said.

Hitachi has been trying to promote a more American image, beginning with a five-part advertising campaign initiated at the time of the NAS purchase in February. "Hitachi feels that, in order to be more successful in this market, they need to become more American," Mulloy said. "And that means hiring American workers and manufacturing more products in America. Hitachi already has a considerable manufacturing investment here, and they plan to continue that."

Patriotic factor

One unknown factor is whether the direct Japanese ownership will deter sales in segments of the U.S. market, Djurdjevic said. "The user should buy what is best for him, rather than wrapping himself in the American flag," Djurdjevic said.

The head of the Hitachi Data Systems board, Toshi Kitamura, continues to be the senior executive managing director of Hitachi's International Operations. Tetsuo Tanaka, the chief of financial control at Hitachi's Odawara Works, will be the chief financial officer of Hitachi Data Systems. Yoshiro Kuwata, general manager of Hitachi International Operations, will chair the executive committee.

The new NAS management team has been meeting for the past two weeks. Their first job, Mulloy said, is to evaluate the potential within NAS, which is a $900 million business with 2,200 employees worldwide. NAS claims to have installed about 1,500 systems in North America and an equal number internationally.

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MCI cops major Westinghouse network pact

PITTSBURGH — It took Westinghouse Electric Corp. 1½ years to choose a vendor to provide two-thirds of its Westinghouse Communications subsidiary's communications needs for the next five years. But last week, the company finally selected MCI Communications Corp. over MCI archrivals AT&T and U.S. Sprint Communications Co. as the winner of the $75 million to $100 million contract.

MCI will supply the recently formed subsidiary with a high-speed network backbone that combines Vnet virtual networking service, dedicated T1 and T3 lines and probably Integrated Service Digital Network services in the near future, according to David Edison, executive vice-president. The backbone will handle voice and data for both the subsidiary and its systems integration and value-added networking business.

AT&T lost out not only to MCI but also to Northern Telecom, Inc. Northern's DMS 250 switches will replace AT&T System 85 private branch exchange systems throughout the subsidiary. The competition was close, with AT&T proposing a customized Tariff 12 offering and Sprint and MCI bidding equivalent packages, Edison said. Westinghouse will use AT&T and Sprint for specialized networking needs, he added.

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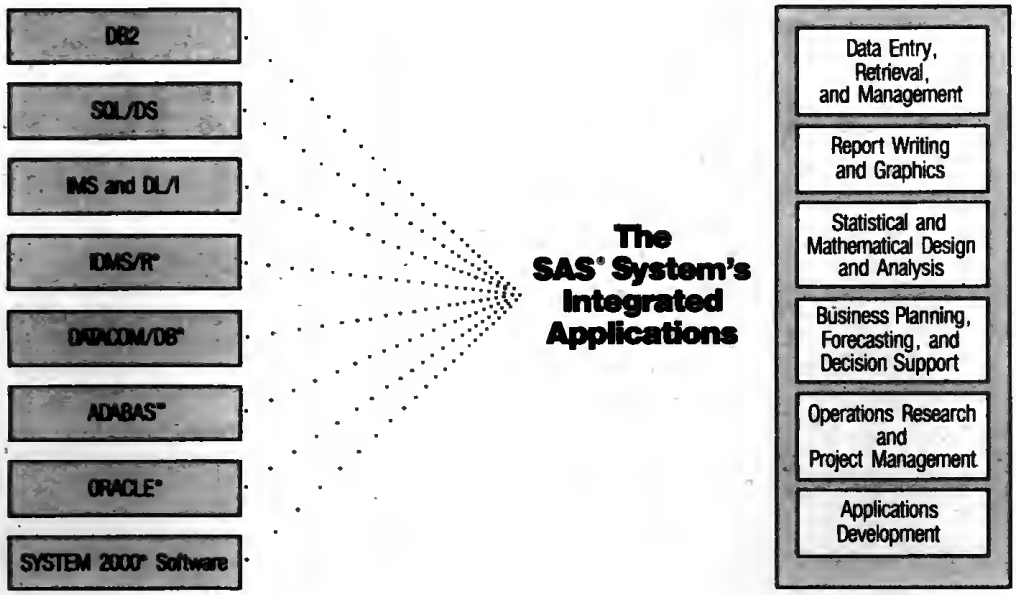

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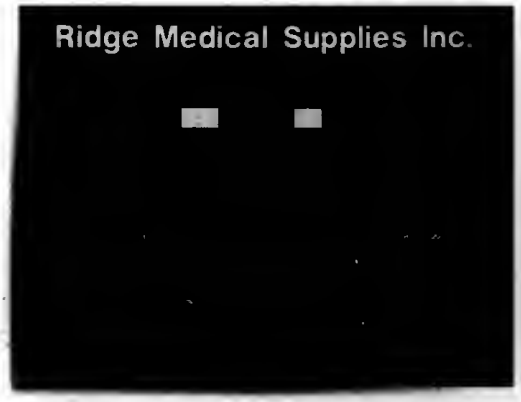

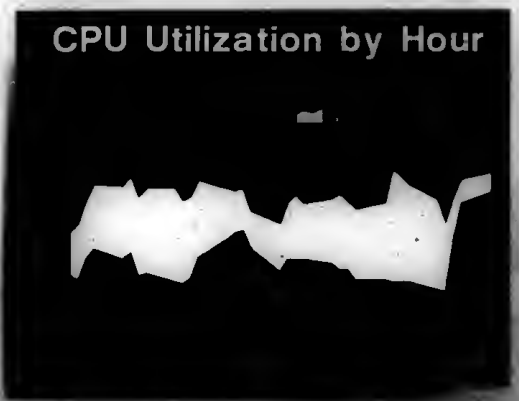

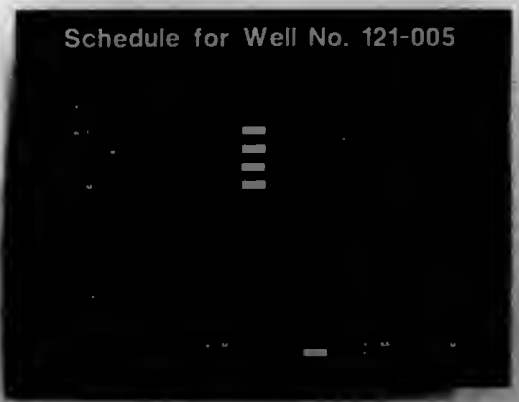

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Norad site plagued by development problems

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Deep inside Colorado's Cheyenne Mountain, the military's attack warning center has had a host of problems trying to develop computer systems. According to the latest audit, automation of the Space Defense Operations Center is more than four years late and will be 54% over budget.

Last December, the U.S. General Accounting Office (GAO) disclosed similar problems in the upgrade of communications processors at the North American Aerospace Defense Command center, known as Norad [CW, Jan. 9].

The GAO's new report focuses on part of the Norad system that tracks up to 10,000 satellites. Much of the tracking information is handled manually, so the U.S. Air Force launched an ambitious automation project in 1983 with Ford Aerospace and Communications Corp. as the prime contractor.

However, since then, the program "has been marked by management problems, unrealistic expectations and program delays," the GAO reported. Completion was scheduled for June 1988 at a cost of $290 million, but the Air Force now estimates the system will not be fully operational until fiscal 1994 at a cost of $446 million.

In a rebuttal to the audit, the U.S. Department of Defense acknowledged past problems — blaming them on Ford's "inefficient software design" — but said the Air Force has taken "positive actions" to fix them.

The GAO said the basic technical problem was that the multilevel security software developed by Ford made the system run too slow on an IBM 3083 mainframe. System performance degradation ranged from 20% to 50%, according to limited tests.

For example, a January 1988 test for retrieving a single message, which should have taken less than 10 seconds, took 18 minutes. The result, the GAO said, is that "functions such as notifying national decision makers that a satellite is under attack take as much as four times longer to complete than required."

The Air Force said the performance problem will be fixed in the future by upgrading to IBM's more powerful 3090 processors.

The managerial problem, the GAO said, was that the Air Force continued to spend money "without resolving underlying technical problems, hoping that difficult, fundamental problems would somehow be resolved in later phases of the program."

Control Data sells branch to Primerica

Minneapolis-based Control Data Corp. took another step toward financial stability last week with the sale of its Action Data Services division to St. Louis-based Primerica.

Action Data sells and supports products aimed at financial services institutions, particularly consumer credit firms. Primerica's Commercial Credit Co. division is its largest customer.

Last month, CDC closed its ETA Systems supercomputer operation and announced a streamlining of its Cyber mainframe business. The Action Data sale, the terms of which were not disclosed, followed close on the heels of CDC's April efforts to steady its shaky profit profile by focusing tightly on its more reliable services businesses.

It is unlikely to be the last. At last week's annual meeting, Chief Executive Officer Robert Price emphasized the firm's "unshakeable . . . determination and willingness to do whatever it takes" to move CDC back into the black.

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Senate bill seeks to eliminate halon in five years

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Production of halon-1301, the chemical used in fire-suppression equipment for many computer rooms, would be phased out in five years under a Senate bill introduced last week.

The provision is part of a package of legislation, sponsored by Sen. Albert Gore Jr. (D-Tenn.), that aims to halt the destruction of the Earth's protective ozone layer by chlorofluorocarbons (CFC) and halon.

The bill is a long way from being passed, but it is the latest evidence of government interest in banning halon, a potent ozone depleter. Two other bills, introduced in March, proposed a halon ban in 1997, and the U.S. Environmental Protection Agency last year announced a goal of eventually phasing out the production of halon.

Du Pont Co. and other halon producers are searching for a substitute chemical. Otherwise, MIS managers may be forced to use water sprinklers [CW, Oct. 3, 1988].

"The future for the [halon] business is uncertain until we do have a substitute gas," said Rich Pierce, senior project engineer at Pyrotronics, a halon system vendor and division of Cerberus Technologies, Inc. in Cedar Knolls, N.J.

Pierce said Du Pont has raised its price for halon by 10% to pay for research and development efforts to find an alternative gas that can be used in existing fire-suppression systems.

Gore's bill would impose an excise tax on the manufacture of CFCs and halon during the five-year phaseout. Half of the revenue would go to a trust fund to develop alternatives to ozone-depleting substances. Ozone in the upper atmosphere shields the Earth's surface from some of the ultraviolet radiation that can cause skin cancer and eye cataracts in humans and damage forests, crops and wildlife.

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IBM nears rollout of 4M-bit chip

BY ROSEMARY HAMILTON
CW STAFF

IBM said last week it has reached a "mass production" phase with its 4M-bit chips and that they will be integrated in commercial products by year's end.

In late 1987, an IBM laboratory director had said he hoped to see the chips in finished systems by January 1989. An IBM spokesman said last week that the lab director's comment was not an official IBM commitment and that IBM is still on schedule with the chips.

"That was a best-guess estimate, and as an approximation, he was correct," the spokesman said.

IBM demonstrated a 4M-bit chip in a prototype of a memory expansion card for Personal System/2s earlier this year at Comdex/Spring '89. However, the IBM spokesman would not say whether it would go with that product for the commercial debut of the 4M-bit chip. He would only say that IBM "will have 4M-bit chips in products sometime this year."

When IBM introduced the 1M-bit chip, the first processors it appeared in were its high-end mainframes, the 3090s.

The spokesman said IBM has moved beyond the "engineering samples" phase of the 4M-bit chip development and is pleased with the yields.

"I think IBM has the capability today to put it into limited production," said Per Flaatten, manager of industry intelligence at Arthur Andersen & Co. in Chicago.

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Bringing the ocean to dry land

Woods Hole center uses robotics to spark interest in the seafloor

***Editor's note:** This is one in a series of profiles of nominees for the* Computerworld Smithsonian Awards, *recognizing individuals and organizations that have achieved outstanding progress for society through the use of information technology. The awards will be presented in a ceremony held June 20 in New York.*

BY AMY CORTESE
CW STAFF

WOODS HOLE, Mass. — This month, thousands of students throughout the country began exploring the darkest depths of the ocean — without ever going near the water.

Making use of advanced robotics and imaging technology, a project undertaken by the Woods Hole Oceanographic Institute is enabling children gathered at a dozen museums to view seafloor exploration broadcast live via satellite.

The Jason project, as it is called, seeks to stimulate interest in science and technology among children in grades four through 12.

As part of the program, the students will complete a curriculum that was developed by the National Science Teachers' Association (NSTA) that includes elements of oceanography, archaeology, geography and technology. More than 250,000 students from 2,000 schools will participate.

Studies have found that U.S. students rank well below other industrialized nations in science literacy.

"Our hope is that kids will get excited about science rather than thinking of it as closed off somewhere in a lab," explained Marily Dewall, a coordinator of the Jason program at the NSTA.

The project is the culmination of a dream long held by Robert Ballard, a senior scientist and director of the Center for Marine Exploration at the institute. Ballard's expeditions have included the first manned exploration of the Mid-Ocean Ridge, the discovery of hot vents and their unusual animal communities and the discovery of the *Titanic*.

THOMAS KLEINDINST

With the help *of Argo, Jason explores the undersea world*

Ballard is leading a team of scientists aboard the research vessel *Hercules*.

After a series of mishaps, including rough seas and broken fiber-optic cable, the live broadcasts began last week as scheduled.

The expeditions will explore sites in the Mediterranean Sea, including an active underwater volcano and the archaeological remains of Roman ships along ancient trade routes. Geologists and archaeologists are aboard the research vessel to discuss what is being seen and answer questions from the children through a two-way audio linkup.

The project is made possible by Jason, an advanced marine imaging system using robotics and fiber optics to transmit information from the seafloor to the surface. The notion of "telepresence" ushers in a new era of exploration, according to Dave Gallow, assistant director at the Center for Marine Exploration and project coordinator of Jason.

"With it, we can project our senses to the seafloor" without having to be physically present, he said.

Jason, named for the legendary Greek explorer, is a remotely operated vehicle equipped with color video cameras and lighting equipment.

It is carried by a mother vehicle, called Argo (after the vessel that, according to the legend, carried Jason on his quest for the Golden Fleece), which is also equipped with a system of television cameras and sonar to give a view from above.

The Argo/Jason development project began with funding from the Office of Naval Research and Technology in the early 1980s. The first research resulted in a search and survey system that helped discover the *Titanic* wreck.

Next, a small prototypical remotely operated vehicle, dubbed Jason Jr., was designed and equipped with color video and still cameras. Jason Jr. performed successfully on the *Titanic* and provided the basis for development of a larger and more sophisticated Jason. More than 13,000 feet of fiber-optic cable and a special handling system were built to transmit television-quality pictures from the seafloor to the surface.

The Jason project is the culmination of this research. With the assistance of Electronic Data Systems Corp., a partner in the project, the telepresence concept is taken one step further and transmitted to museums throughout the country.

The Argo/Jason technology means new productivity for researchers and ushers in the prospect of real-time exploration. In the past, three people were needed to man a submersible vehicle that spent five hours descending and ascending, leaving only three hours to atudy the ocean floor.

The Argo/Jason technology allows unmanned exploration to proceed 24 hours a day, seven days a week, if necessary. Through the live images that are transmitted, the entire ship can witness and react to the exploration.

"We were on the moon five years before we were on the crest of the Ocean Ridge," Gallow said. The ridge, which circles the earth's perimeter, is the planet's largest mountain range. According to Gallow, man has seen less than 1% of it and is still in the infancy of exploring the ocean floor, although it covers a majority of the earth's surface.

The Argo/Jason technology has broad potential, including searching for downed airplanes and laying underwater pipelines and cables. But for Gallow and others involved in the project, one of the great rewards is seeing the excitement of students as they share in unlocking the secrets of the sea.

BILL O'CONNELL

Assistant director Gallow (right) *and Craig Dorman, institute director at the Center for Marine Exploration*

ACCORDING to Gallow, man has seen less than 1% of the Ocean Ridge and is still in the infancy of exploring the ocean floor.

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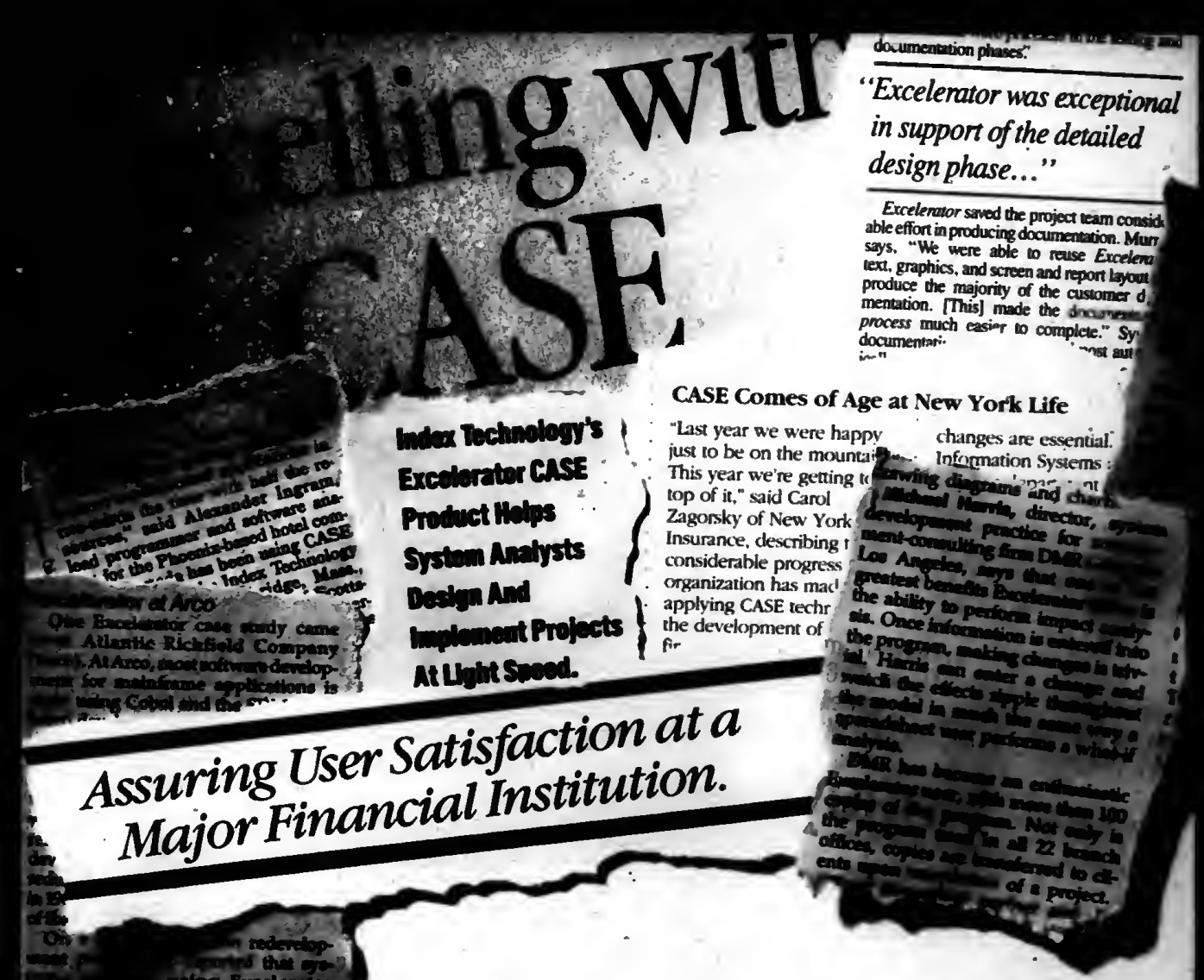
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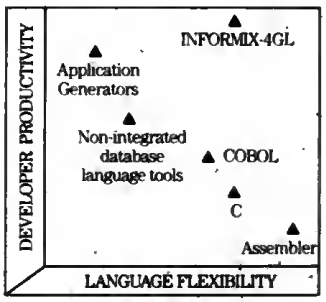

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EDITORIAL

A yen to grow

MUCH HAS BEEN made of the industrial decline of the U.S. recently, so it seems comforting to find one area in which our country holds a commanding lead over foreign competitors. When all else fails, we can still point to our prowess in software development.

But maybe not for long. As this week's page 1 story on Japan and the software industry points out, the U.S. is facing some immediate and daunting software competition from across the Pacific. Although it appears Japanese companies will find it harder to crack the U.S. software market than other areas, this is no time for U.S. companies to fall asleep.

Every indication is that Japanese computer companies are moving fast and hard to increase their share of the $50 billion world software market. Fujitsu, Hitachi, Toshiba and NEC are just four that have dramatically boosted software investments in recent years. Some of their investments have taken the form of U.S. software subsidiaries with teams of U.S. programmers. Others have involved intensified efforts to build software in Japan.

And it is not just the Japanese computer makers who are getting into the act. Noncomputer companies such as Nippon Steel and Nomura Securities are entering the fray as well. All are leaving the door open for taking equity positions in U.S. companies.

What's encouraging for the U.S. industry is that the Japanese appear to be facing the same dilemma in software that has dogged U.S. manufacturers throughout this decade: cultural incompatibility. Ironically, some of the same factors that have made U.S. businesses inefficient manufacturers — unwillingness to enforce discipline, emphasis on the individual, high employee mobility — make it a fertile breeding ground for maverick software developers. Japan's rigid, team-oriented approach to production just doesn't work in an atmosphere that values creativity.

But it would be a terrible mistake for the U.S. software industry to assume that this will always be a barrier. The tides are turning toward an approach to software development that favors the Japanese style. As the delays and missed shipment dates that are raining down from U.S. software makers show, it's simply becoming much more difficult to develop software. Ideas for new products are plentiful, but the time required to execute them is multiplying rapidly. If the software industry doesn't take an assembly-line approach to developing software soon, we may all be in trouble.

Finally, Japanese computer companies bring a lot of yen to the table. What they cannot build, they can buy, and indications are they are prepared to do just that. There are many ways to enter a market, and ambitious Japanese computer makers appear ready to use them all. U.S. software makers would do well to learn a lesson from the leader in steel, semiconductors and consumer electronics: Ambivalence will do you in.

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LETTERS TO THE EDITOR

Future in TIMS

In response to your recent article [CW, March 20] on text information management systems (TIMS), we would like to offer a few observations based on 15 years of involvement in the field.

There have historically existed very different roles for TIMS and DBMS based on their fundamental approaches to structuring information. Retrieval from fixed-length (DBMS) and unstructured (TIMS) fields today are almost mutually exclusive. Some key techniques and functions apply to both and will most likely merge in the near future.

The industry is finally beginning to see truly integrated information systems, combining several heretofore incompatible technologies into a seamless environment. Because the storage and retrieval of information is the central focus here, we see TIMS as the central hub that binds these capabilities into an integrated system for users and unlocks their full potential.

As this evolution continues, areas in which users should exercise caution include limited PC solutions, limited solutions for larger systems, trendy buzzwords and phrases for things that are really not new, critical limitations of such things as stand-alone imaging and text add-ons to systems that are designed primarily for other tasks.

This is indeed an exciting field with revolutionary prospects for users, if they carefully evaluate the alternatives facing them and expect high standards of support and performance from technology providers.

William G. Griffith
President
Information Dimensions, Inc.
Dublin, Ohio

50Z not problem

I am writing in response to "PS/2 Model 50Z proves too hot for Dbase IV to handle" [CW, April 24]. We feel the key issue is not the Model PS/2 50Z and Dbase IV 1.0, but rather Dbase IV and DOS 4.0 on a network. Your article failed to mention one very important point: Dbase IV is not certified to run under DOS 4.0. Both the Dbase IV and Dbase IV Developer's Edition boxes clearly state that the products will only run on DOS 3.10 to 3.31 on a network. Moreover, a page entitled "Additional Important Changes" that is included with the documentation states, "Install will abort under DOS 4.0 if you attempt to use the DOS SHARE command."

We advise our customers that one workstation on the network running the combination of DOS 4.0 and Dbase IV 1.0 will bring down the entire network. This is why the customer profiled in your article found that workstations running DOS 3.31 on the network also were affected.

Since your article appeared, we have received a number of calls from customers who are successfully running both the 50 and 50Z. We have also received a few reports of install problems with the 50Z. We are currently working with IBM to isolate the problem and encourage anyone experiencing this to call Ashton-Tate's Technical Support.

Joe Budge
Dbase IV Product Manager
Ashton-Tate Corp.
Torrance, Calif.

Poor taste

I was dismayed to read the offensive comments attributed to an unidentified IS manager who was comparing Excel and 1-2-3 in Douglas Barney's column [CW, April 17]. Sexist remarks such as that one are depressingly common among men in IS, but that is no justification for repeating them. It is especially incumbent upon a magazine of your prestige to exercise some judgment as to the nature of the comments you print.

Characterizing a woman as nothing more than a product to be discarded whenever a sufficiently improved one comes along is equally tasteless and offensive. It is disgraceful but true that millions of women (and their children) have suffered from precisely this type of treatment.

I expect your magazine to be in front of the changes in business today, not indulging in locker-room banter with good old boys. Allowing comments such as this one to be printed is evidence of an antediluvian mentality on your part, which disappoints me.

Mark Marcellus
Auburndale, N.Y.

Right name

In the article "Insurance conclave advocates IS reform" [CW, April 3], the author quotes "economist Arnold Schumpeter." Professor Schumpeter's first name was actually Joseph.

Bruce M. Hobbs
Partner
Engineered Software
Alhambra, Calif.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Japanese software no threat

Rather, inroads must be made via investment in U.S. software houses

CHARLES P. LECHT

Lest you think that Japanese software companies selling Japanese-made software are set to invade the U.S. marketplace as Japanese hardware companies did, forget it. It'll be a cold day in hell before that happens.

But lest you attribute this to lack of competency in software development, you can forget that too. They'll not enter this marketplace with homemade software because they can't get in where they may want to and don't want to get in where they can.

The area Japanese software firms would like to enter is MIS development. The area they are eschewing is basic software: operating systems, compilers and the like.

The greatest expertise of Japanese software houses, thus the area where they could potentially make the greatest impact abroad with homegrown products, is in MIS. MIS in Japan has seen stupendous growth in the past 10 years, thus suggesting that in the MIS applications development area, Japanese software people may be second to none. They didn't make it all happen using abacuses or magic. Modern industrial competitiveness is as dependent on MIS support as flying a 747 is on wings.

Lecht is an IDG News Service correspondent based in Tokyo.

Just not the same

But MIS in Japan isn't what it is in the U.S. While the data to be processed may be essentially the same, the institutional infrastructure it serves is dramatically different. Believe it: Japanese companies operate very differently than U.S. companies do. MIS in Japan supports a materially different objective — only its form appears the same.

Japanese business does not use MIS software created abroad. What they use is "made in Japan."

This made-in-Japan software has many obstacles to acceptance in the U.S., not the least of which is the severe language problem that exists between the two countries. Since MIS touches the heart of a company and cannot succeed without the deepest management involvement, Japanese software people are blocked from gaining access to U.S. MIS by the inability of Americans to speak Japanese.

Does this mean that no Japanese companies can or will enter the U.S. MIS marketplace? No, it doesn't. Several of the largest Japanese software makers have opened offices in the U.S. But these operations are primarily relegated to offering MIS services to Japanese companies operating abroad. Their secondary mission is to find software to bring back to Japan.

Notable among the group of Japanese software companies with offices in the U.S. is the highly successful CSK Group; NAIS, a company partially owned by NEC Corp.; Japan Systems Corp.; and the same Recruit company that is involved with the payoff scandal that brought down Japanese Prime Minister Takeshita.

In the basic software area — operating systems, compilers — Japanese companies have wisely avoided entering the U.S. marketplace. U.S. prowess in this area is unrivaled. An attempt by the Japanese to offer basic software in the U.S. would yield

NICOLAE ASCIU

equivalent results, say, to the entry of British food companies in the gourmet food marketplace in France. And the decision of Japanese software companies to not push into the U.S. doesn't have to do with technological brightness; there's no shortage of brain power in Japan. It has to do with business acumen. It represents a frank admission by the Japanese software community that it cannot hope to compete in a marketplace so well serviced locally that its presence may not even be noticed.

Most Japanese software houses are "captives" of larger companies, without whom they cannot survive. They are financially weak and unable to function without the constant support of their captor/benefactors. Entering a foreign marketplace costs money, and unless their benefactors approve such a move, they must remain at home. Given the shortage of computer industry skills at home — Japan has negative computer industry unemployment — most Japanese software companies have all they can handle to survive in Japan.

What about Japanese investment in U.S. software companies? Some has taken place, but to date, it has been very limited. This is the only route Japanese software companies can currently take to become an important factor in the U.S. marketplace. But it'll be a long time before they arrive, if ever.

Keeping up with the Jones' microprocessor

RICK BLUM

I'm usually a progressive thinker. I've spent the better part of two years as a product planner for a major minicomputer maker. I once even thought about joining the World Futurist Society. But the unhappy fact is that I'm simply not ready for the Motorola 68040 — nor the Intel 80486, for that matter. Call me a computer Luddite, but that's the way I feel.

In late March, Motorola announced the most recent member of its 68000 family of microprocessor chips, the 68040, which promises to deliver three to five times the performance of the current 68030 by squeezing 1.2 million transistors onto a single chip. Delivery dates will be announced later this year.

Not surprisingly, Motorola's announcement preceded the April introduction at Comdex/Spring '89 of the hot new 80486 chip by rival Intel. The 486 will more than double the speed of the 386, making it approximately equal in performance to the 68040, according to industry analysts.

So how come these events are not raising goose bumps on my arms? If the benefits of the 80386 have yet to be realized because of the lack of software, isn't doing something twice as fast on an 80486 still nothing? Is it wrong to expect one chip to be fully utilized before the next is introduced?

Blum, a former product manager at a Boston-area computer company, now lives and writes in Carlisle, Mass.

Ghost ship

And what's so thrilling about a 68040 that doesn't have a delivery date? Motorola wouldn't even specify the date that it will announce a delivery date. In fact, it was only weeks ago that Sun Microsystems announced a new workstation based on the 68030. If Sun can't keep up, why should I?

Then again, maybe I simply have become inured to the ever-spiraling hype of chip makers, systems integrators and software developers. No — I don't think that's it. Rather, I think my newfound reluctance to herald the development of these new chips is more personal.

In February, my wife and I decided to buy our first personal computer. After being responsible for planning and pricing computer systems that sell for up to $100,000 and more, I thought that buying a PC would be a piece of cake — until I checked our bank account. The realization that a PC and laser printer would make a bigger dent in our savings than our last car was a tad shocking.

TRY IMPRESSING your neighbors with refresh rates and internal storage capacity, particularly when they drive something painstakingly crafted in the Black Forest of Germany by gnomes with engineering degrees from MIT.

Admittedly, I never buy new cars and certainly not anything promoted as intelligent. Still, even your basic American subcompact is big enough to transport two small adults and a couple of toddlers comfortably. It can stir admiring comments merely by not breaking down every 10,000 miles. On the other hand, try impressing your neighbors with refresh rates and internal storage capacity, particularly when they drive something painstakingly crafted in the Black Forest of Germany by gnomes with engineering degrees from MIT.

Undaunted by the minimal status points a PC would accrue me, my wife and I began shopping for the perfect system. It didn't take long to decide on an Apple Macintosh, since we plan to do some desktop publishing. The only real issue we had to face was this: Should we spend an almost reasonable sum for the proven power and performance of a 68020-based Macintosh SE or should we sacrifice repainting the house this year for the four-fold performance improvement of an SE/30, which uses the 68030.

Being the forward-looking fellow that I am, I convinced my wife that we should take the plunge and go for the SE/30. "After all," I reasoned, "we should be buying for the future, not just for today." Plus, I get to impress my friends with the hottest in PC technology.

She bought my logic, and we bought our SE/30 in March. The setup was easy, and learning Mac commands a snap. Within a month, I was a power Macintosh user, ready to dazzle even our BMW-driving friends, Pete and Midge.

One Saturday, Pete and Midge stopped by for a visit. The day was idyllic; winter's chill had been shrugged off by a radiant spring sun. I carefully laid out boursin canapes and organic vegetables. The sesame-dill dip my wife had prepared perfectly complemented the California white zinfandel, which I had chilled to a palate-tingling 42°.

As Pete and Midge walked in the door, I casually flipped on the Mac and dived into MacDraw II. In a flash I created a line drawing of our long-planned deck, complete with hot tub and cabana. I quickly shaded in the special features, such as built-in drink holders in the railings, and then rotated the entire drawing 90°. With a finishing flourish, I annotated each feature in outlined Venice script.

By this time, Pete was peering intently over my shoulder at the screen. I turned to him smugly and said, "So, what do you think?"

Pete looked at me with a slightly furrowed brow and replied, "Wouldn't it have been smarter to wait for the 68040 model?"

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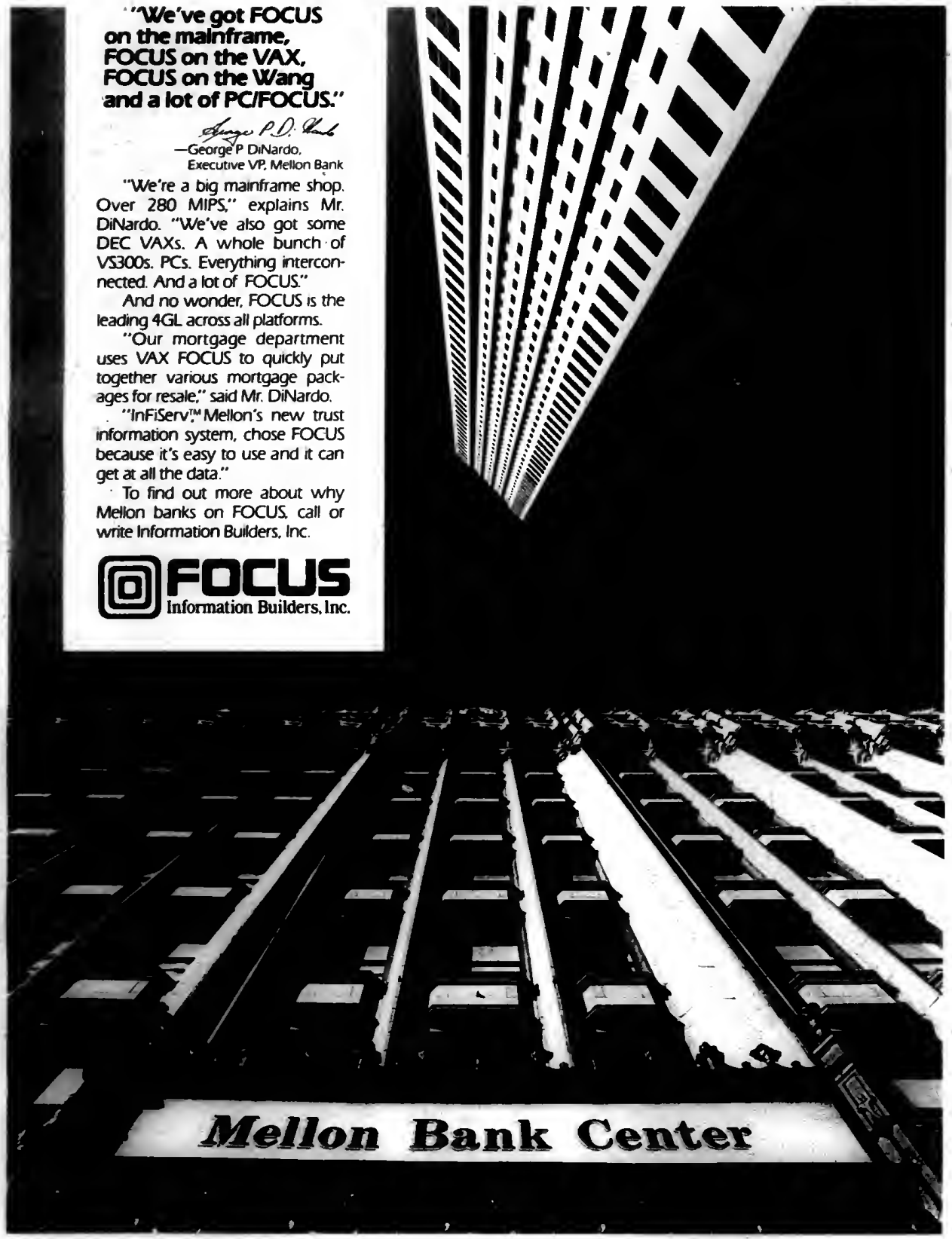

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SOFT TALK

Stanley Gibson

Bandwagon hopping

Drama buffs may recall Monsieur Jourdain in Moliere's *Le Bourgeois Gentilhomme*. The nouveau riche swells with pride when his literature instructor tells him that great literature is written in prose, and M. Jourdain has spoken in prose all his life.

Now that object orientation is all the rage, vendors similarly can be depended on to come forward and declare that their products have been object-oriented all along. This will add to the confusion in a young and fragile world in which there is already a lack of understanding of just what object orientation is.

It was puzzling a few weeks ago when the Object Management Group (OMG) was created without including a single vendor that one could think of as selling object-oriented technology. I have in mind such firms as Servio Logic, Ontologic, Graphael and the object-oriented language vendors Stepstone, AT&T Bell Laboratories and The Whitewater Group. (Sorry if I left anyone out.)

The object-oriented database management systems vendors say they were not contact-

Continued on page 36

DEC marches on to repository

Hopes its CASE songs will go rolling along

ANALYSIS

BY AMY CORTESE
CW STAFF

Computer-aided software engineering (CASE) is still preached more than practiced, but Digital Equipment Corp. has been quietly putting into place the pieces of an integrated CASE environment.

Building on its common user interface and network, the firm envisions a global repository containing information used by various software tools physically distributed across a network.

While DEC sees different roles for VMS and Ultrix, its CASE strategy seeks to deliver similar capabilities under both operating environments and to interconnect the two through shared standards.

At the core of this strategy is DEC's Common Data Dictionary Plus (CDD Plus). As with IBM and its repository strategy, DEC wants CDD Plus to be the global repository that holds information about enterprisewide data. The various database management systems and tools, whether by DEC or third parties, will access common data stored in the repository, although they may keep specific data in their own dictionaries.

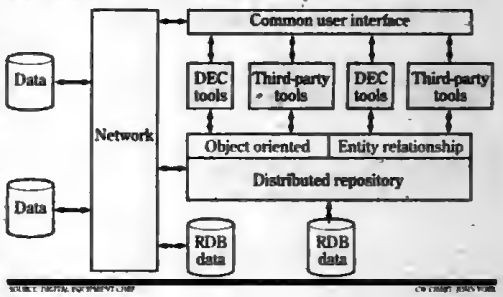
Gig Graham, director of software services at Stamford, Conn.-based Gartner Group, Inc., said both IBM and DEC have to put their houses in order. DEC, though, is "four to seven years ahead of IBM, depending on how you measure it," he said. Nonetheless, he said, both need to make progress toward providing a means to describe applications in a general way that can then be transformed into a database-specific language, much the way a compiler translates a high-level language into a machine-specific one.

CDD Plus currently runs only under VMS, but by adhering to evolving standards such as the

Continued on page 32

Three keys to CASE

A common user interface, network services and a distributed repository are at the heart of DEC's CASE strategy



Users capitulate to cheaper 3090 memory

BY ROSEMARY HAMILTON
CW STAFF

Users are starting to come around to third-party suppliers of IBM 3090 memory, mostly because of big price breaks.

When both EMC Corp. and Cambex Corp. introduced 3090 memory products late last year, users initially said no thanks. They said they did not want to do business with anyone other than IBM when it came to such critical components as main memory on their most expensive systems, the 3090s.

But several users contacted last week said they were willing to take a risk with third parties because of the cheaper prices. Also, most users contacted said they had established relationships with third parties for memory products on other IBM systems. This gave them the confidence to expand to the top-of-the-line 3090s.

Some of the deals users are getting from third parties are hard to beat. Most users will not give specific prices but said doing business with third parties represents significant savings.

The Pennsylvania National Mutual Casualty Insurance Co. in Harrisburg, Pa., actually made money on its deal with Cambex Corp. According to Rex Fleetwood, vice-president of data systems, an asset swap of 64M bytes of IBM main memory for the equivalent amount of Cambex memory netted $100,000.

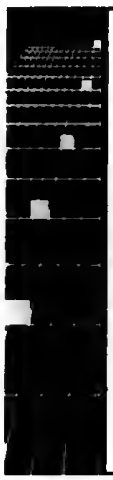
According to Cambex, the two parties arrived at a fair market price for the IBM memory that was approximately $100,000 more than what Cambex was charging for its 64M bytes. Pennsylvania National swapped IBM memory for Cambex memory and picked up a rebate in the process.

Fleetwood said he has relied on third parties for years. He narrowed down his choice of supplier to EMC and Cambex and found that Cambex offered the better deal.

Continued on page 37

Inside

- Healthnet goes to market. Page 31.
- Dexpo South gives DEC users food for thought. Page 31.



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MIS spin-off builds with CASE

Consolidated Healthcare's service bureau cites increased flexibility

ON SITE

BY STAN KOLODZIEJ
CW STAFF

The corporate parent of Blue Cross/Blue Shield of Virginia is taking its computer and communications services to market by forming a service bureau.

To make the start-up group more effective, managers are betting on computer-aided software engineering (CASE) tools intended to combine the flexibility of microcomputers and the power of mainframes.

A year ago, Consolidated Healthcare, Inc., which operates the Virginia health insurer, revamped its IS operations to form Healthnet, which is aimed at bringing in business from other companies. The mandate for Healthnet's Applications Services department is to garner 50% of its business from outside organizations by 1991, according to assistant general manager Rick Napier.

"I want to build a business that will be quick to respond and quick to build applications," Napier explained. With that in mind, he is using Information Engineering Workbench (IEW) and Analysis Workstation from Knowledgeware, Inc. Both personal computer-based analysis and design tools will serve as front ends for Knowledgeware's Gamma code generator running on Healthnet's IBM 3090 Model 600E mainframe.

Napier also employs entity modeling, Houston consultant Ron Ross' diagram-based software methodology that is intended to provide an intuitive approach to development and is supported by Knowledgeware products.

Napier said he wants to make PCs the front ends for all new application development and "restructuring" of existing applications. "The workstation is an aircraft carrier, and computer-aided software engineering is going to make applications fly off it," he said. Napier said he expects the work Healthnet does for its clients to be typical, in that 85% of MIS resources are aimed at maintaining existing programs, while 15% involve new applications.

Many key applications are 15 years old and hard to change, Napier noted. At the same time, companies want to differentiate themselves from competitors, and they look to systems to support their new strategies. With CASE and tools such as IBM's DB2 and SQL, he said, applications can be quickly renewed and extended, and they will then need a fraction of their previous maintenance to boot.

Napier's plan is to have a team of seven programmer/analysts in place by the end of the year. His first hurdle has been to prove his CASE strategy to management. He aimed to do so with a project called Football, a computerized football league concocted to demonstrate CASE skills.

MANUELLO PAGANELLI/WOODFIN CAMP

Healthnet's Napier *has quick business plans*

Napier assigned the project to Samantha Magnusson, a newly recruited programmer/analyst with a background in Unisys Corp. and Prime Computer, Inc. programming but no experience in CASE or entity modeling. In 60 days, Magnusson delivered the system, becoming competent in CASE and demonstrating the program to management.

Napier maintains that programmers can do 90% of design on CASE workstations with the system. They can create a complete entity model, fully attribute it and data-type it on the workstation. "I can then generate a first-cut SQL database directly from that," he said. "I don't even need a design workstation; I just need a relational translator."

Using such methods frees mainframe resources while streamlining the programming analysis and planning stages, he added. "The code generator side [of programming] has always been strong, but when you combine that with good front-end analysis tools, you can really get speed," Napier claimed.

The Applications Services department is set to cut its first real CASE teeth this spring with a project at its sister company, Health Communications Services.

MANUELLO PAGANELLI/WOODFIN CAMP

***Magnusson** learned to play CASE football*

Disaster recovery, optical storage on Dexpo's stage

BY JAMES DALY
CW STAFF

ATLANTA — Digital Equipment Corp. system users will get no shortage of ideas on how to improve the usefulness of their machines this week as a variety of vendors plan to use the Dexpo South exhibition as a forum for demonstrating new products.

Among those scheduled to assume celebratory airs is Comdisco Disaster Recovery Services, Inc., which will announce a major expansion of its DEC disaster backup capability. The plans include the addition of a VAX 8810 and a set of peripherals to the VAX 8700 configuration at its North Bergen, N.J., office as well as enhancements to its Wood Dale, Ill., and Cypress, Calif., sites.

The burgeoning optical storage market will get a nod when Advanced Technology Systems, Inc. unveils Lcache, a software system that integrates optical disk storage systems with VAX machines running VMS. The Vienna, Va.-based firm said the software provides transparent access to write-once read-many optical technology.

MIS managers concerned about product integration will be the target of Techgnosis, Inc., which will introduce an enhanced set of software modules that the firm claims allows seamless cooperative processing between the Apple Computer, Inc. Macintosh and host environments in a network.

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Continued on page 37

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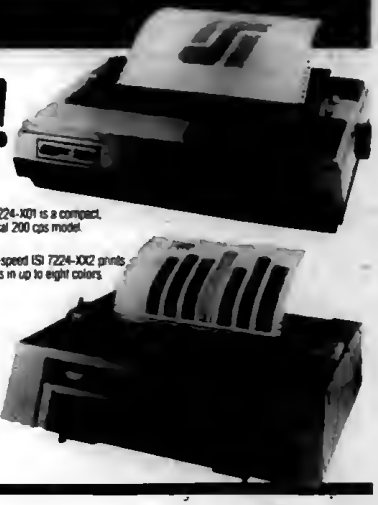

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Teradata to add optical storage

BY JAMES DALY
CW STAFF

LOS ANGELES — Teradata Corp. indicated last week that it will deliver optical storage as an integrated option with its DBC/1012 Data Base Computer system possibly by the end of this year.

The storage system, which will bring both relational and SQL functionality to the optical media, will arrive via a step-by-step implementation plan with early capabilities scheduled by the end of the fourth quarter, said spokeswoman Pattie Adams.

Heartthrob

Since its introduction a few years ago, optical storage has quickly grown close to the hearts of MIS managers, who are weary of crowding their shops with acres of large-scale direct-access storage devices, according to industry observers.

"Instead of having to store large volumes of useful data on off-line media such as magnetic tapes or microfiche, our customers will have on-line access to optical technology," said Chairman and Chief Executive Officer Kenneth W. Simmonds.

The new optical storage media will be provided by Rockville, Md.-based Filetek, Inc., a mass storage systems supplier.

Teradata produces both an Intel Corp. 80286- and 80386-based version of DBC/1012, a fault-tolerant system designed to have the capability to process large and complex relational databases.

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DEC

FROM PAGE 29

ANSI Information Resource Directory Standard (IRDS), it will be able to run across multiple platforms, according to CDD Plus product manager Wendy Herman.

CDD Plus reportedly provides active support for languages such as Cobol and Basic, DEC's Rally 4GL, RDB, RMS, DBMS and Decforms. As the repository evolves, DEC intends to integrate more layered products.

A missing piece not currently supported is Datatrieve, a DEC file management product that is used by a large portion of DEC customers, Graham said.

Third-party products typically have their own storage repositories but may store some information in CDD Plus. To do so, vendors must write to the Digital Standard Relational Interface, a proprietary interface, as Index Technology Corp. and Signal Technology, Inc. have done.

Graham said the role of CDD Plus is to be the central design dictionary, while separate tools and DBMSs will have their own runtime dictionaries.

However, independent software vendors are faced with the dilemma of supporting more than one repository. "We're the typical third-party vendor; we have to talk to IBM's DB2, DEC's RDB, as well as our own dictionary," said J. Aaron Zornes, Relational Technology, Inc.'s (RTI) director of strategic marketing.

Despite an agreement with DEC to jointly market Ingres Tools for the VAX, RTI does not support CDD Plus, although it has long-term plans to do so.

DEC, like IBM, relies heavily on third parties for CASE tools. Its own offerings are primarily programmers' tools like Vaxset, a package of productivity utilities. The VMS-based Vaxset includes tools, such as a language-sensitive editor, a source code analyzer and a module manager, that provide VMS users with functionality that is built into the Ultrix operating system.

CDD Plus uses the entity-attribute-relationship model, but DEC disclosed plans to add an object-oriented interface later this year for representation and control of conventional software.

NEW DEALS

University enrolls IBM 3090

The University of Utah signed a $22 million deal with IBM to set up a supercomputing center near its Salt Lake City campus. The heart of the center will be an IBM 3090 600S, which was installed last month and is expected to be operational next month. The school claims to be the first university to have installed a 3090 600S.

Unisys Corp. announced that the U.S. Postal Service had ordered an additional 13,000 Integrated Retail Terminals (IRT) for post office point-of-sale operations. The $30 million order now brings the total number of terminals that Unisys will provide to 31,000 units. The company is basing the IRTs on its Series 20000 window workstations and said it is producing approximately 500 a week.

North Carolina Agricultural and Technical State University in Greensboro, N.C., recently installed a Convex Computer Corp. supercomputer to be used for its major research projects.

Concurrent Computer Corp. sold $500,000 worth of its new Microfive real-time systems to one of France's leading suppliers of betting systems, the Societe d'Exploitation du Pari-Mutuel Oller, or Sepmo. The Paris organization will use the Concurrent Microfive systems to support both racetrack and off-track betting operations. A Sepmo spokesman said that on a good day, the organization handles about 300,000 transactions, with about $1.7 million changing hands. Sepmo has been a Concurrent user since 1983.

Copley Computer Services recently bought a Digital Equipment Corp. Vaxcluster 8842 and transaction processing software for $3.5 million. The company is the data processing division of The Copley Press, Inc., which publishes weekly and daily newspapers, including the *San Diego Tribune*.

Underpriced DEC storage debuts

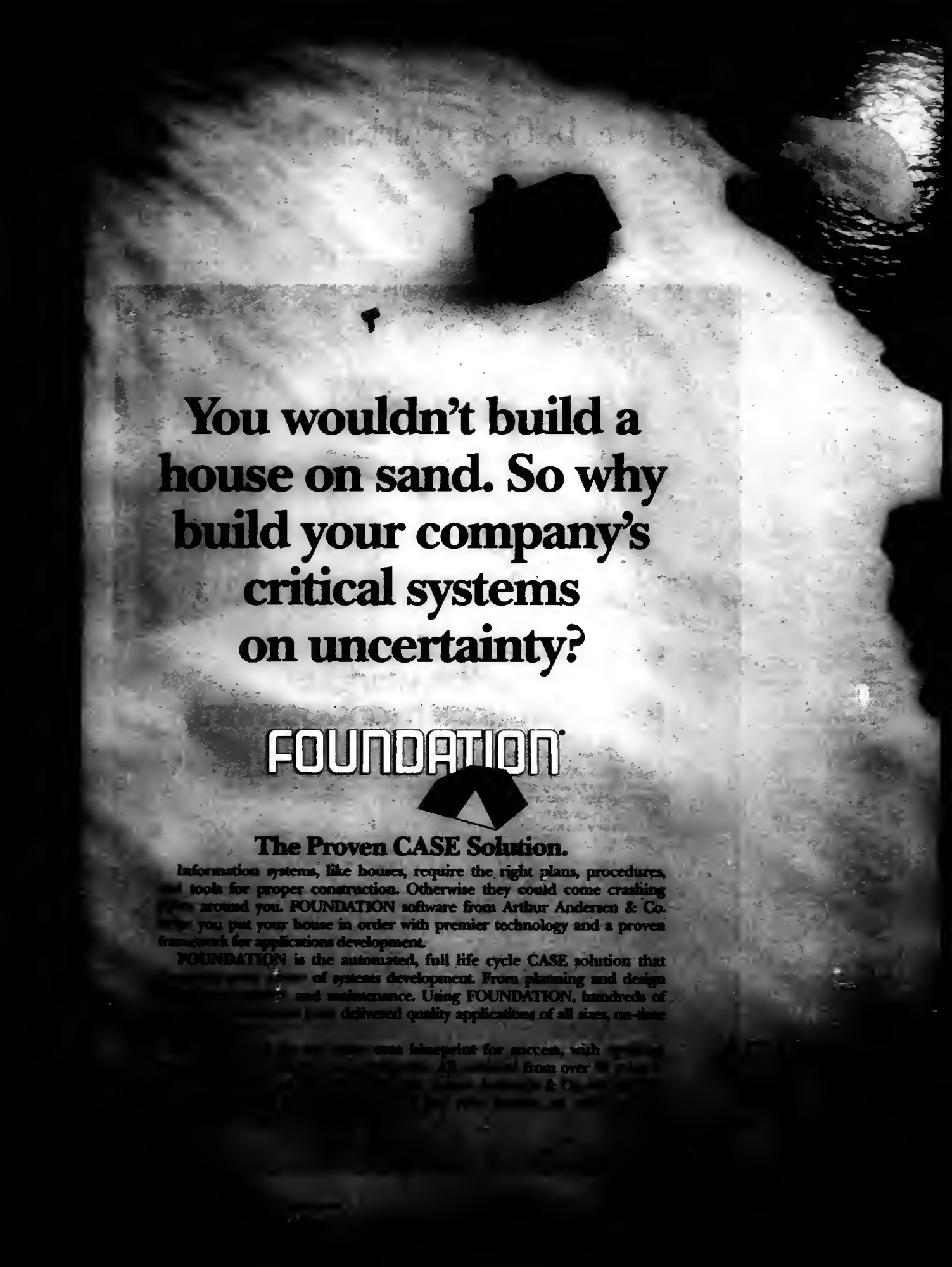
FRAMINGHAM, Mass. — Berkshire Computer Products, Inc. made a big play for the Digital Equipment Corp. storage market late last month by introducing both disk and tape product lines that it said will sell for an average of 30% less than the DEC offerings.

The Maximizer Series consists of seven disk subsystems available with drive capacities ranging from 665M bytes to 12.25G bytes of storage.

According to Berkshire, the disk subsystems are fully compatible with DEC's Digital Storage Architecture and can plug directly into any of DEC's Standard Disk Interconnect controllers.

The tape products, which make up the Discovery 1 line, support both the DEC Unibus and Q-bus systems. Four models make up the line, including one dual-density and three triple-density products. Transfer rates range from 1.2M to 320M byte/sec.

Berkshire said it will price the tape subsystems as much as 45% less than the comparable DEC tape products. For example, its P3100, which has a transfer rate of 625M byte/sec., will sell for $16,900, about 45% less than the price of the comparable DEC TU 81, the company said.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Interface remains Unix obstacle

BY PATRICK WAURZYNIAK
CW STAFF

SANTA BARBARA, Calif. — If Unix is ever to hit the commercial market big-time, it had better find an acceptable user interface quickly, according to managers who have to support that operating system.

While many business users have a lengthy Unix wish list, nothing ranks higher than a graphical user interface as a priority for those users intending to put Unix into mainstream commercial applications.

"It's a big problem," said Lt. Col. Terry Elton, assistant for communications and computer systems for the deputy assistant secretary of the Air Force. "If we had a good user interface for Unix, it would be much more straightforward."

Proponents pushing Unix to current and prospective customers recently debated the Unix choices here at the Executive Uniforum Symposium, a conference cosponsored by Patricia Seybold's Office Computing Group and the /usr/group.

A puzzlement

Although there are other missing pieces in the Unix puzzle such as inadequate security and a relative scarcity of business applications, concerns remain over the continued standards war being waged by two competing Unix consortiums, the Open Software Foundation (OSF) and Unix International. Users said they wonder which group will emerge as a standard-bearer with a viable graphical interface.

Like many other MIS managers starting to implement Unix in commercial applications, Geoffrey K. McDowell, manager of information systems at Four Seasons Hotels Ltd. in Toronto, sees the interface as the most important missing link in the Unix equation.

"An easy common user interface is important to us because we have to integrate applications from several third-party vendors," McDowell said.

McDowell, who recently installed the first of several Unix-based Hewlett-Packard Co. systems at Four Seasons, said he is leaning toward the OSF's Motif.

In the interim, Four Seasons has written its own shell scripts. However, McDowell said that "they're kludges" that are not consistent with all of the hotel chain's applications, which are written in Cobol, C and some fourth-generation languages, McDowell said. Standards, including a graphical interface, are the main reason McDowell's firm went from Data General Corp. systems to Unix.

"The people who use our systems aren't sophisticated," McDowell said. "It's a more important that the person behind the desk can greet you and know the right buttons to push, so standards are very important."

Many users such as Susan Spalter, director of the Information Systems Division at the Boy Scouts of America in Irvine, Texas, were initially attracted to Unix to free themselves of dependence on computer vendors' proprietary hardware.

"We came out here because we got into Unix for our own reasons and we feel a little like an island," said Spalter, whose group has had Texas Instruments, Inc. Unix systems since 1987. "It seems like the world is into the technology of Unix, not what the end user is doing with it."

The military would greatly benefit from a common Unix user interface, which would dramatically reduce time and money that is spent training military personnel, Elton said.

With military personnel moving to new assignments and officers changing missions every three years, such an interface could prove invaluable, Elton said. "It's important for our people in the Air Force because they move all over the world," said Elton, who noted that the Air Force will install about 22,000 Unix-based AT&T computers in administrative applications.

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SOFT NOTES

X/Open moves to match federal standards

X/Open Consortium, an open systems group in Stamford, Conn., recently announced a research project aimed at making its software-portability specifications more closely aligned with the U.S. government's Federal Information Processing Standards. Douglas Simms, an X/Open research associate, will spend at least three months identifying differences between the X/Open Portability Guide and standards adopted by the National Institute of Standards and Technology.

/Usr/group, which calls itself "the international network of Unix users," may change its name to Uniforum, the name of the group's trade show. That change was recently approved by /usr/group's board of directors. The organization's members will vote on the issue in June. Ed Palmer, /usr/group's executive director, said the old name was appropriate when the group was formed in 1980 because most members were Unix programmers. Now membership is changing, Palmer said, and those who are not Unix programmers and those outside the U.S. do not understand the name.

Verdix Corp. in Chantilly, Va., announced last month that it has signed an agreement with IBM to make its Verdix Ada Development System compatible with the IBM AIX operating system. The Verdix system includes a validated Ada compiler and other software development tools for government and industry use of Ada. Terms of the IBM deal were not disclosed.

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Bandwagon

FROM PAGE 29

ed by the group. A spokesman for AT&T Bell Labs says his organization was contacted but elected to remain on the sidelines for now.

So what gives? Well, it turns out that the Hewlett-Packard New Wave object management environment is really a front-end environment and not a back end, such as a DBMS. So OMG is now simply concerned with the front end, although it says that may change later on.

It seems clear that the OMG was formed so that its members might get in on the ground floor of whatever standards-setting occurs in the object-management arena. It has moved into a vacuum and is thus the only game in town. It is perhaps hoping that its group will be the place to go when it comes time for standards in object-oriented languages and DBMSs as well. AT&T, fearful of stirring up another Open Software Foundation-like controversy, is keeping its comments on the group muted.

While this preliminary jockeying prior to widespread object-oriented acceptance is going on, it is important to note that object-oriented databases do not require an object-oriented front end to work. Nor do front ends require object-oriented database management systems. Furthermore, object-oriented databases themselves are generally not written in an object-oriented language, and applications working on top of them do not need to be, either.

Given the crying need for greater productivity and the apparent ability of object-oriented technology to satisfy that need, it is in everyone's interest that confusion about object-orientation be cleared up as soon as possible. It would help, for starters, if vendors would say whether they are involved in creating a front end or a back end.

It would also help users to know that they need not wait for all possible object-oriented technologies to become standardized and in sync with one another to begin putting one of them to use.

Gibson is *Computerworld's* senior editor, software.

Amdahl ports IBM software

BOSTON — Amdahl Corp. recently claimed to outdo IBM in the front-end communications processor arena by announcing a software migration tool that will allow users to run several releases of IBM networking software on the Amdahl 4745.

Currently, users of the newer IBM communications processor, the 3745, are required to run Release 5 of its Network Control Program (NCP).

According to Amdahl, that means a more painful migration when users elect to go from the older 3725 to the 3745 because they have to upgrade their NCP release as well.

Amdahl said its 4745 will run earlier versions of NCP rather than requiring users to run the most current one. As such, users can bring their current release of NCP with them when they move to the 4745.

When they decide to migrate, they can load NCP Release 5 along with their older release, Amdahl said.

In addition, the migration aid, announced recently at an Amdahl user group meeting here, will allow users to switch back and forth between releases.

Amdahl said the software utility is included in the current processor prices.

Memory

FROM PAGE 29

James Matsy, corporate director of information systems at Reynolds Metals Co. in Richmond, Va., said he selected EMC for 3090 memory because of a good track record. The company has bought memory for IBM System/38s from EMC.

"Our feeling is we shouldn't have to pay IBM prices, like memory is a specialty item. It's a commodity," Matsy said.

Matsy said the risk of using a third party for 3090 memory is minimal. Prior to finalizing the deal with EMC, Matsy discussed his plans with IBM, and his IBM representatives put forth a number of reasons not to do business with that firm. So Matsy presented those issues to EMC and made sure they were addressed in his contract with the firm.

For instance, the IBM representative warned that buying third-party memory could mean problems with an upgrade from an E model to S model. Matsy said EMC agreed to guarantee that its memory products, now running on an E model, would run on an S model.

Dexpo

FROM PAGE 31

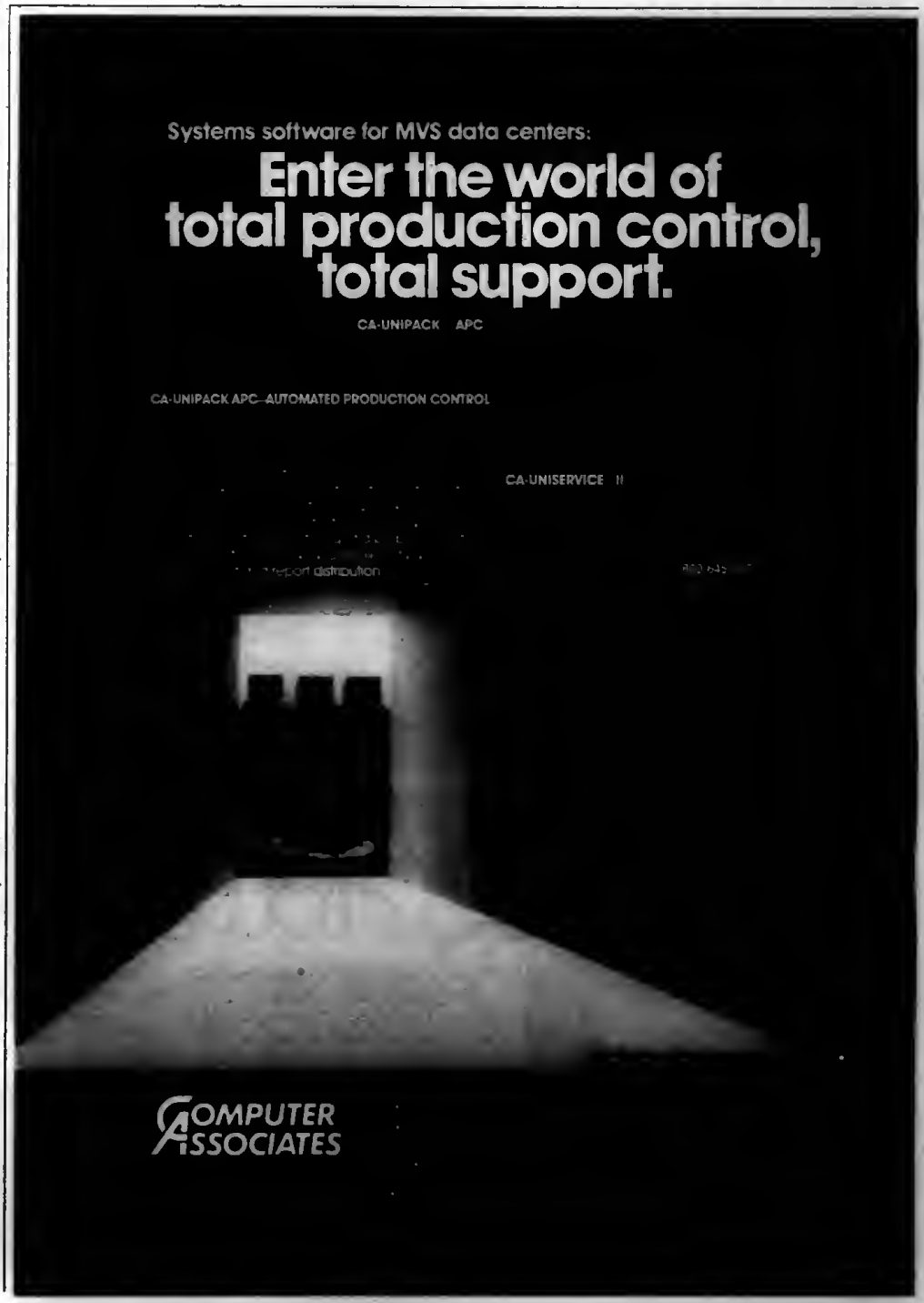
workstations that require simultaneous access to the server, the Boca Raton, Fla.-based firm said. A typical price configuration will begin at $4,995 for the server module with an additional $200 to $700 for each connected workstation.

DSD Corp. will trumpet the arrival of new, enhanced versions of its C-Calc Plus spreadsheet and graphics software as well as the C-Plan project management and control system. C-Calc Plus licenses will begin at $950, while licenses for C-Plan will start at $4,500, officials at the Bothel, Wash., firm said.

Coral Springs, Fla.-based Derex, Inc. will unveil its Champion Raster Image Processor, which the firm claims pumps up the printer emulation and high-performance graphics capabilities of its S3000 II and S4500 II Ion printer series. The processor is available immediately and begins at $18,995.

FEL Computing in Williamsville, Vt., will announce a new version of its Mobius personal computer and VAX integration software package that will include support for Western Digital Corp. Ethernet adapters. The new package will be available immediately and will be priced at $325.

Other scheduled rollouts include Phoenix Data, Inc.'s introduction of two signal conditioning products: the eight-channel filter module and the four-channel strain gauge module.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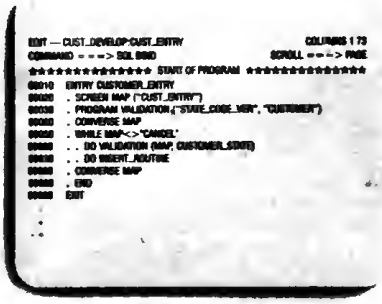

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NEW PRODUCTS — SYSTEMS

Processors

Compuscan, Inc. has announced its Start Optical Image Management System, an Intel Corp. 80386-based, 32-bit system capable of supporting as many as eight users, the vendor said.

The product was designed to replace manual document filing and to speed access to desired information, according to the company. Features reportedly include a 19-in. resolution monitor, a keyboard, a compression and decompression board and an eight-port gateway communication function. An optical disk drive, hard disk, magnetic tape drive, image scanner, laser printer and software are also provided.

A basic configuration costs $60,000.

Compuscan
300 Broadacres Drive
Bloomfield, N.J. 07003
201-338-5000

A document storage-retrieval system that is based on optical disk technology has been introduced by Packard Bell.

Called Optifile, the turnkey system incorporates a Packard Bell computer, a 15-in. display monitor, a 300 dot/in. laser printer, a 400 dot/in. flatbed scanner and an optical disk storage subsystem, according to the company.

The system reportedly uses either 5¼-in. optical disks with an 800M-byte capacity per disk or 12-in. disks with a capacity of 2G bytes each. Optifile costs $39,850.

Packard Bell
9425 Canoga Ave.
Chatsworth, Calif. 91311
818-773-4400

I/O devices

Lexi Computer Systems Corp. has announced an envelope feeder designed for Lexi and Kyocera laser printers.

The Lexi Envelope Feeder reportedly handles 5,000 to 10,000 envelopes monthly, the vendor said, and is especially suited for medium-volume mailing applications, including billing, press releases and direct-mail marketing. The feeder holds between 60 and 100 No. 10 business-size envelopes.

The product runs in IBM System/34, 36 and 38, Application System/400 and 3270 environments and costs $995.

Lexi Computer
231 Sutton St.
N. Andover, Mass. 01845
508-681-1118

An ASCII display terminal designed for use in harsh industrial environments is available from Fargo Electronics, Inc.

The WD-50 Video Terminal can be used for process control interface or remote source data entry directly from the factory floor, the vendor said. The product is reported to be plug-compatible with most systems, and features include an 80- or 132-column, 14-in. diagonal screen in green or amber with a high-resolution character set.

The terminal is priced at $1,895, and volume discounts are available.

Fargo Electronics
7690 Golden Triangle Drive
Eden Prairie, Minn. 55344
612-941-9470

Two modular bar-code terminals for the industrial environment have been announced by Welch Allyn, Inc.

The Scanteam 1100 and the Scanteam 1200 products are available in either RS-232/RS-422 or RS-232 multidrop protocols and offer optional display capabilities, the vendor said.

Additional features of the Scanteam 1200 include an 8K-byte memory that is expandable in two 32K-byte increments and an auxiliary RS-232 I/O port.

Scheduled for delivery in June, the 1200 is priced from $830, and the 1100 is priced at $465.

Welch Allyn
Jordan Road
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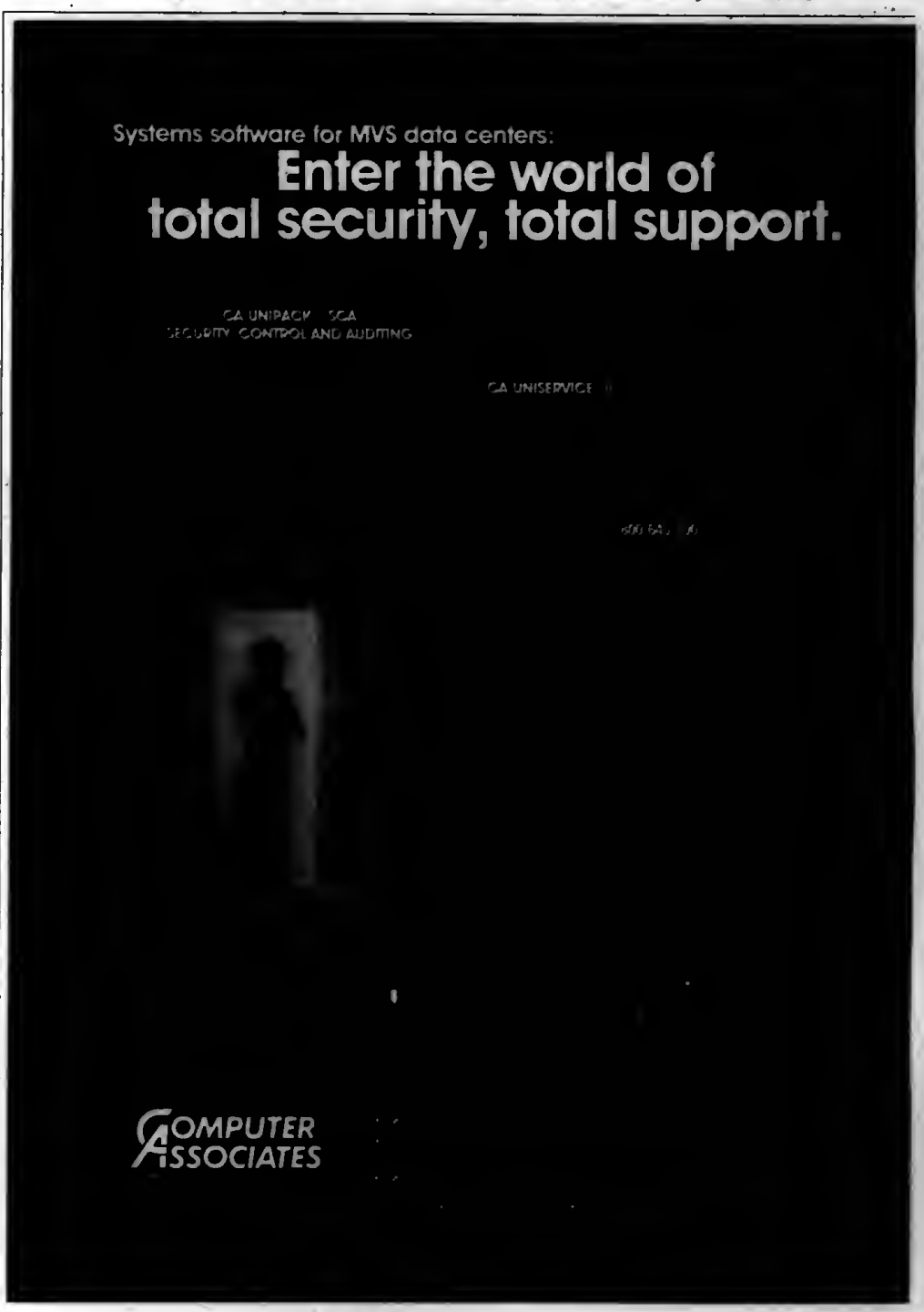
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NEW PRODUCTS — SOFTWARE

System software

Software AG of North America, Inc. has released Version 3.1 of Review, a performance management package for MIS and data center managers.

The product enables users to monitor the Adabas database management system and Complete or Adabas TPF transaction processing environments as well as Natural fourth-generation language and non-Natural applications that interface with Adabas or Complete, the firm said.

The latest release reportedly includes detail or summary reporting capabilities for performance tuning, trend analysis, program debugging and other functions.

Version 3.1 is priced from $11,400 for the DOS or the VM Group 40 environment and from $17,000 for the IBM MVS Group 40 environment.

Software AG
11190 Sunrise Valley Drive
Reston, Va. 22091
703-860-5050

Digital Equipment Corp. has released Version 2.0 of its system management tool, the VAX Performance Advisor.

The product runs on VAX/VMS processors, and the latest release has been enhanced to offer capacity planning functions, the vendor said. Functions reportedly include automatic collection, storage and archiving of VMS data, artificial intelligence-based data analysis and performance-modeling capabilities. Pricing ranges from $750 to $23,750, depending on CPU.

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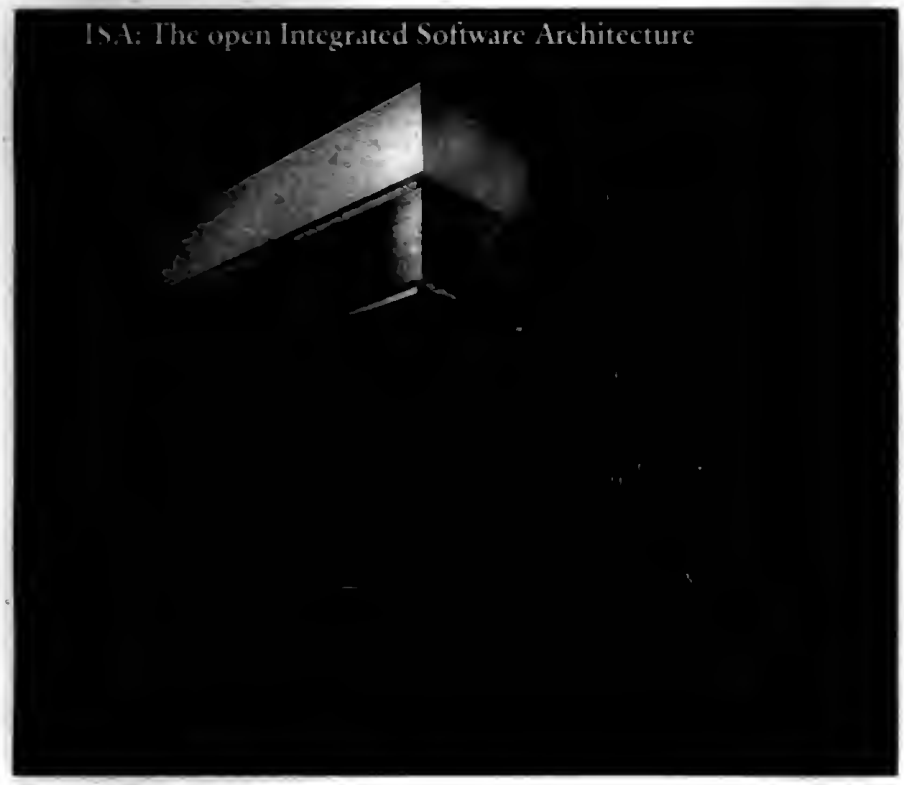

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Database management systems

On-Line Software International, Inc. has announced an integrated software package designed for analyzing, maintaining and tuning IBM DB/2 systems, the company said.

Proalter/Plus reportedly allows DB/2 database administrators to use IBM ISPF-like panels to view and modify DB/2 objects and to optimize application performance. The product is priced at $25,000. One- and three-year lease plans, multicopy discounts and corporate licenses are also available, according to the vendor.

On-Line Software International
Fort Lee Executive Park
2 Executive Drive
Fort Lee, N.J. 07024
800-526-0272

Software designed specifically for Cullinet Software, Inc. IDMS/R programmers has been announced by Data Base Architects, Inc.

Using Online Testbench, programmers will no longer have to share test databases, according to the vendor. The program reportedly provides an isolated, stable, IBM TSO-based development environment that includes security against accidental modification or loss of data. Priced at $24,000, the software is available to interested users on a free 30-day trial basis.

Data Base Architects
980 Atlantic Ave.
Alameda, Calif. 94501
415-521-7300

Development tools

Cullinet Software, Inc. has announced that Cullinet Enterprise Computing technology has been extended to the PC-DOS operating environment.

The company has introduced the Enterprise:Builder and Enterprise:Generator for PC-DOS professional software developers.

The products will reportedly aid in the development of both stand-alone and cooperative processing personal computer applications and can be integrated into mainframe applications built with Cullinet's IDMS/R data-

base management system and ADS/Online fourth-generation language.

Both packages are priced at $4,000 per unit. Volume discounts are available.

Cullinet Software
400 Blue Hill Drive
Westwood, Mass. 02090
617-329-7700

A software implementation management system for distributed software development on Unix-based networks is now available from Oasys, Inc.

Paraview reportedly provides an integrated software environment for development, integration, release and maintenance in a multivendor network configuration. The product also offers parallel software development capabilities, the company said, and is priced at $11,000 for a 10-user license.

Oasys
230 2nd Ave.
Waltham, Mass. 02154
617-890-7889

A project management software system designed for MIS software development has been introduced by Mrcics.

Called Lead Programmer, the software requires an IBM 370, MVS and CICS 1.7, the vendor said.

The product includes Gantt display, task scheduling and reporting and is said to provide security features that allow a manager to control access to project management functions. The package is priced at $250.

Mrcics
P.O. Box 22170
Juneau, Alaska 99802
907-364-3200

Languages

Saber Software, Inc. has announced that Saber-C Version 2.1, the company's C language programming environment, is now available to run on Sun Microsystems, Inc.'s Sun-3 hardware family.

The software was designed to aid software engineers in debugging and testing C programs, the company said. Functions reportedly include a multiwindow user interface, an interpreter-based debugger and a program checker. Version 2.1 is priced at $2,500.

Saber Software
185 Alewife Brook Pkwy.
Cambridge, Mass. 02138
617-876-7636

An IBM System/36 RPG II decompiler has been introduced by Statistical Data Research, Inc.

According to the company, Doc converts RPG II load members compiled at any release level back into functionally equivalent RPG II source code. The product reportedly restores all original H, F, E, I, C, O, T and L specifications, including edit code/words and continuation line options. Once restored, the source program can be modified on the System/36 or migrated to an IBM Application System/400 system.

The service is priced at $1.50 per line, with a minimum of $300 per program.

Statistical Data Research
4434 Carver Woods Drive
Cincinnati, Ohio 45242
513-984-5355

Applications packages

H&W Computer Systems, Inc. has released Wizard Mail Version 6.2, its electronic mail package for the IBM mainframe CICS environment.

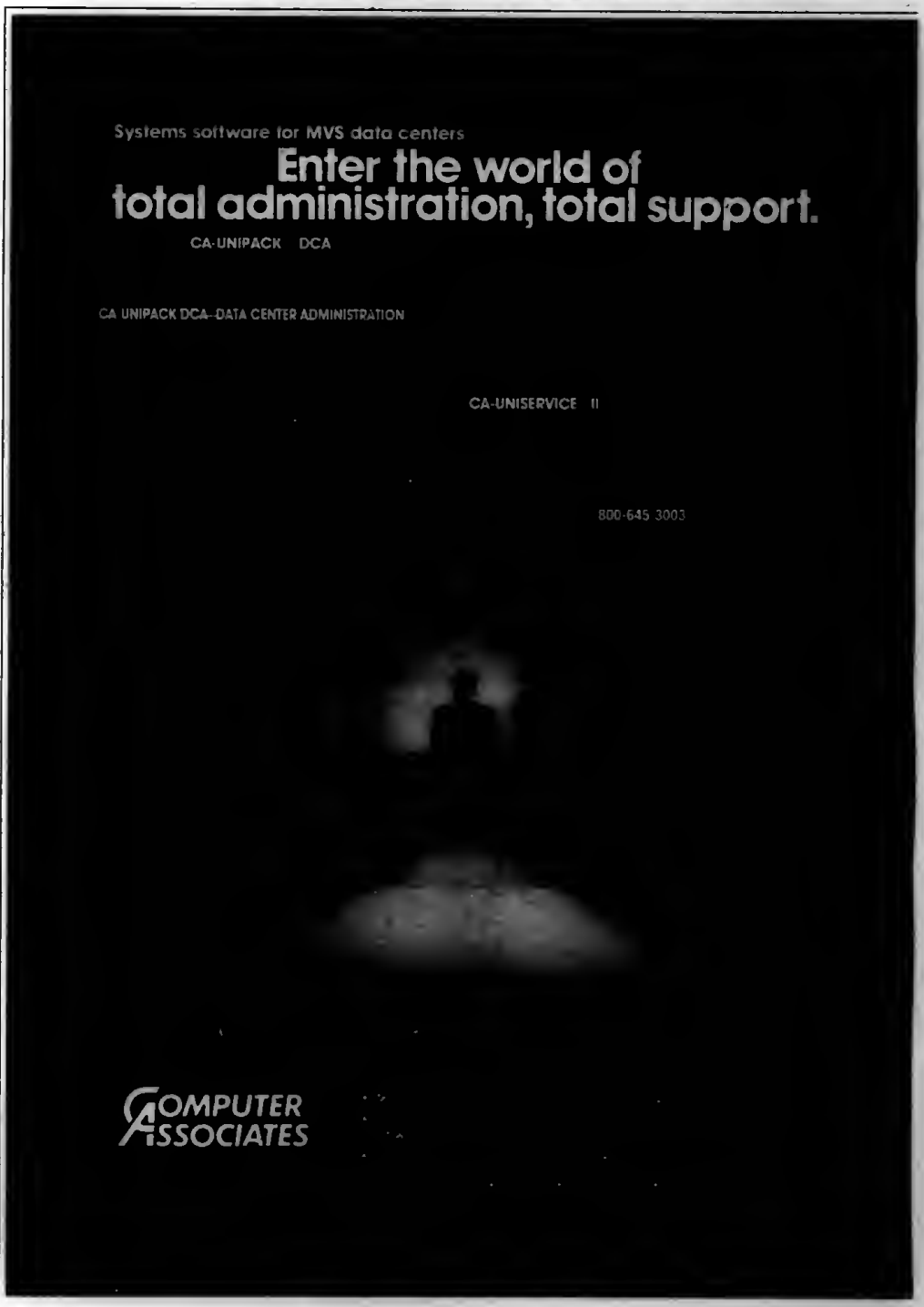
The release offers text-merge and word-wrap abilities and an enhanced spelling dictionary and supports uppercase and lowercase in the message editor. It costs from $3,495 and runs under DOS or MVS with CICS.

H&W Computer Systems
P.O. Box 15190
Boise, Idaho 83715
208-385-0336

Computer Technology Consultants, Inc. (CTC) has announced a sales automation package for micro, mini and mainframe computer users.

Called the Automated Sales Information System, the product is user-customizable and offers support for the complete sales cycle. The base module is priced at $495.

CTC
1600 Pennsylvania Ave.
York, Pa. 17404
800-832-2747



Introducing The Wyse Networker.
It delivers all the power and performance of a 12.5MHz 286 PC. With all the styling and ergonomics of a Wyse terminal.

And while The Networker puts PC capabilities on user's desks, it provides MIS management with data and software security. Users access disk storage over the network. There's no local storage — no removable disks.

The Wyse Networker fits comfortably on less than a square foot of desk space. Yet it comes loaded with a full megabyte of RAM and built-in VGA. Plus the flexibility to work with virtually any network, from 3Com and Novell to IBM Token Ring and Ethernet. Because it's modular, The Networker will adapt readily to other network environments, as well.

The Networker is also part of System-Wyse.™ So it links easily with powerful Wyse 286 or 386 file servers to create network solutions with compatibility and connectivity built in.

The all new Wyse Networker. Only a company that's a leader in both personal computers and computer terminals could come up with a product like it. Which is why Wyse Technology is the company that did. 1-800-GET-WYSE.

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WYSE

MICRO BITS

Douglas Barney

Buyers spurn jazzy options

Digesting big software. Looking at today's new software, you would think every programmer used to sell automobiles. They think software buyers want rally wheels, air-conditioning, sun roofs and the other bells and whistles that car buyers usually fall for.

So programmers, believing they are doing the right thing, toss in every feature ever dreamed about — not caring that the engine can't keep up. Because customers can't refuse these things that should be options, people wind up with software that oinks and a machine that strains.

Most people aren't buying into this software overkill stuff. Some are refusing to buy the overbuilt software packages and are either staying with what they have or shifting to leaner, meaner packages. Hence the success of Foxbase, a speedier implementation of Dbase and the popularity of sparsely featured software from companies such as Software Publishing.

I've heard of several solutions to this problem, and one actually involves no violence. Pro-

Continued on page 58

Extender appeal

Vendors add support in light of OS/2 letdown

ANALYSIS

BY DOUGLAS BARNEY
CW STAFF

For several years, MIS waited for the elusive OS/2 to solve its memory problem, but scant application support and high cost have so far marred its progress.

Because those troublesome personal computer memory constraints still exist, extensions to MS-DOS have become increasingly popular. Some of these products have been available for years, but it has only been recently that OS/2's problems have prompted major software vendors to back DOS extenders.

DOS extenders essentially allow MS-DOS applications and data to reside in so-called high, or protected-mode, memory, of which 16M bytes is addressable by the Intel Corp. 80286 chip. The applications revert to low, or real-mode, memory to use such essential MS-DOS functions as I/O.

DOS extenders require the more sophisticated processors from Intel, but a growing number of high-end PCs are allowing the extenders to carve out a healthy niche.

The key advantage for users is that they do not have to upgrade to a new operating system and a new suite of applications to access more memory. Also, DOS extenders require less memory than large operating systems such as OS/2 and Unix.

The DOS extender dam final-

Continued on page 59

Key DOS extender systems

Environments	
• Rational Systems' DOS/16M	$5,000 with distribution rights
• Phar Lap's 386/DOS-Extender	$495 or $1,495 with unlimited license
• AI Architects' OS/286, OS/386	$495

Applications	
• Lotus' 1-2-3 Release 3	$595
• Borland International's Paradox 386	$895
• Fox Software's Foxbase+/386	$595

CW CHART JOHN VINK

Next big man on Stanford campus

ON SITE

BY JULIE PITTA
CW STAFF

PALO ALTO, Calif. — It is not likely to attain the mass popularity of a fraternity party, but Next, Inc.'s workstation has a growing following among students at Stanford University.

Since its introduction last fall, more than 1,000 Next workstations have been shipped to college campuses across the country. Yet, early experience showed that programming the system was as tough to master as any other course. In March, Next turned its attention toward the general public and corporate world as Chairman and Chief Executive Officer Steve Jobs announced the machine's availability through retailer Businessland, Inc.

Stanford, a Palo Alto neighbor of Next, received its first Next workstations shortly after the system debuted last September. Today, the biggest installation of Next machines is in a Stanford administrative building that also houses networks of Apple Computer, Inc. Macintoshes, IBM Personal Computers and workstations from Sun Microsystems, Inc.

There are nine Next workstations in the cluster at Stanford's Sweet Hall and two Next printers. They are connected in a local-area network using Ethernet. The Next LAN is hooked into the Stanford University Network, a wide-area network also based on Ethernet.

Steve Loving, an academic computing specialist at the university, installed the Next systems. "It was really easy to set up," Loving said. "You just plug it in; there's only one cable from the machines." The machine has Transmission Control Protocol/Internet Protocol capabilities, a key component of the Stanford WAN.

Most of the students who use the Next workstations are enrolled in a programming class taught by Next personnel. Although the class has generated interest among Stanford students, the course has had a less-than-satisfactory completion ratio, Loving said. About 30 students enrolled last quarter, but only five finished the tough course, he said. "The Next programmers are awesome, and they have very high expectations for the students," he explained. "I wouldn't blame it on the machine."

Annie Kreyenberg, a graduate student in computer sciences, is one of those who did not complete the class last quarter.

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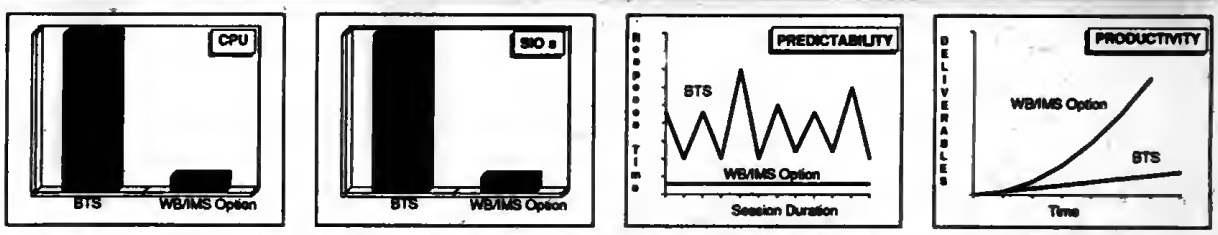
Inside

- Wingz missing some feathers. Page 47.
- Program protects proprietary formulas for 1-2-3 templates. Page 48.
- PCs drive Arizona highway system. Page 56.

Technology Breakthrough: IMS DB/DC on a PC !



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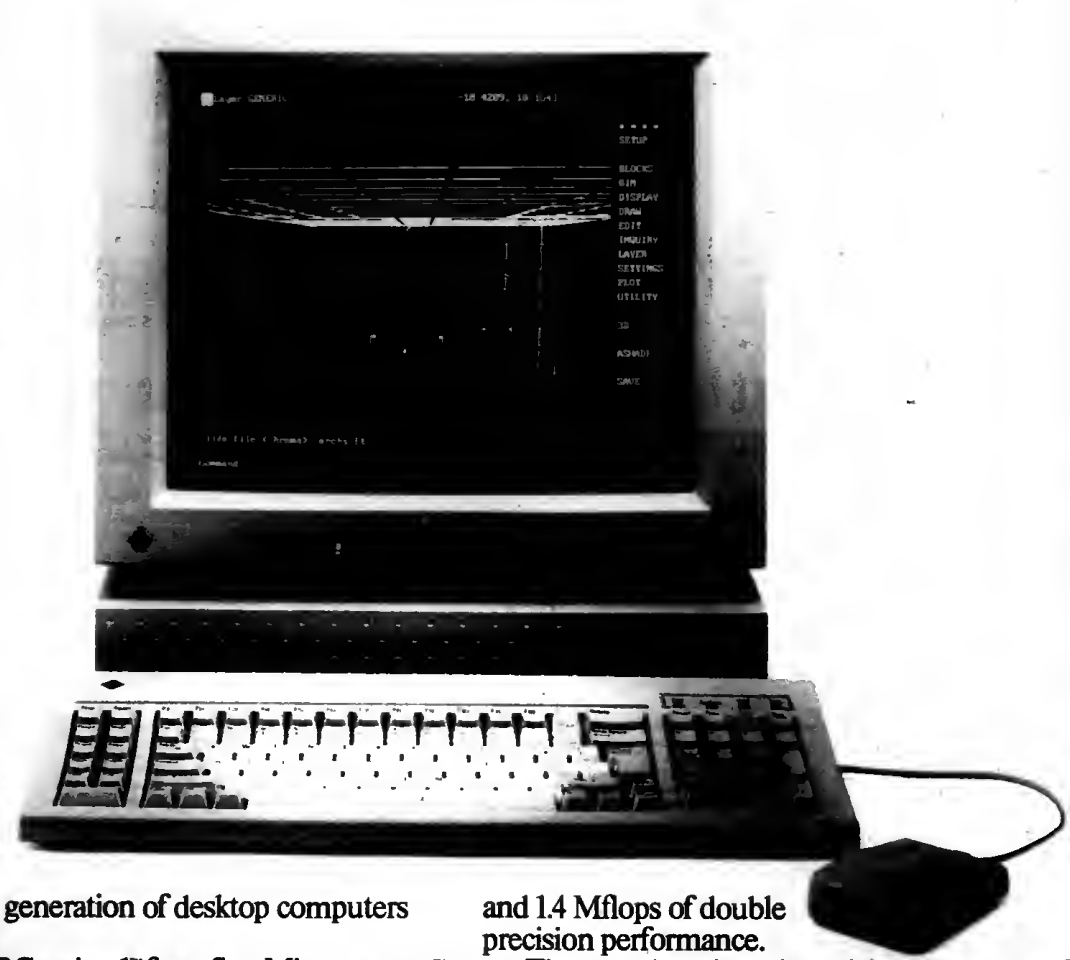

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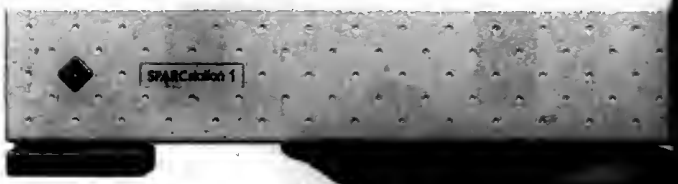
A miracle of RISC miniaturization, integration and innovation, the SPARCstation 1 sets a new benchmark of price, performance and functionality by which all others must be judged.

Simply put: for less than $9,000,* the SPARCstation 1 gives you more power integrated with more features than any other desktop computer in the world. Making it the world's most powerful desktop.

The SPARCstation 1 is smaller than an IBM PC yet it gives you 12.5 Dhrystone MIPS and 1.4 Mflops of double precision performance.

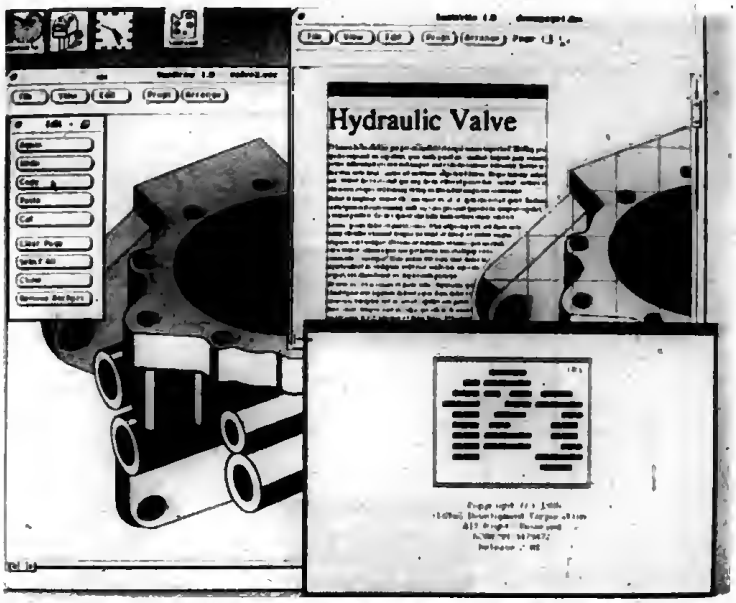
That translates into three times the power of the most fully loaded and hotly accelerated PC or traditional workstation.



The SPARCstation 1. It may look small but when you compare its power and features to anything else on the market, it's clearly the world's most powerful desktop.

*The US list price for one SPARCstation 1 with a 17-inch monochrome/grayscale display and eight megabytes of main memory. Possibly the best desktop computer deal in history. Of course, SPARCstations are available in a variety of configurations to satisfy the needs of different users.

THE WORLD'S MOST FOR THE PRICE OF A PC.



OPEN LOOK™ gives you all the power of UNIX® with an interface that's as easy-to-use as the easiest-to-use personal computer. Point at an icon, click the mouse button and your SPARCstation 1 goes to work at blinding speeds. Shown here SunWrite, SunPaint and SunDraw working with Lotus 1-2-3.

The SPARCstation 1 comes packed with a full eight megabytes of RAM. Expandable up to 16 megabytes. With your choice of a high resolution monochrome/grayscale or color display.

It integrates up to 208 megabytes of hard disk storage. A 3.5 inch IBM compatible floppy disk drive. Built-in 32-bit Ethernet. A blindingly fast SCSI connection. Expansion boxes for up to a gigabyte of additional disk or tape storage.

And it's all enclosed in a 16 inch square box that consumes less energy than a 100 watt light bulb.

If you still need more, there is.

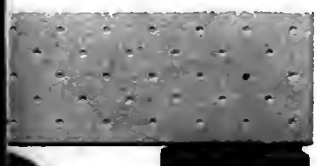
The SPARCstation 1 is the ideal machine for voice mail and multimedia applications. It has its own built-in speaker and microphone jack to record and playback music, voice or any other sound you like to hear.

And with our high-performance GX Series, the performance curve goes right off the chart.

A major technological breakthrough in computer graphics, our SPARCstation 1 GX produces up to 400,000 vectors a second. Giving you two times the graphic performance of any machine twice its price.

And it doesn't just speed up 2D and 3D wire frame applications, it speeds up the overall performance of your system. Including windowing and scrolling through text.

And the list of firsts goes on and on.



The SPARCstation 1 has a new very high speed bus that delivers many times the performance of a MicroChannel architecture. Which makes it very easy for your SPARCstation 1 to expand, connect and communicate with other devices. From Laser Printers to Ethernet gateways.

For 3D applications, the SPARCstation 1 GX lets you interactively manipulate 3D objects at speeds that make ordinary workstations seem downright sluggish.

What's more, the SPARCstation 1 is a member of a whole family of SPARCstations and high-capacity SPARCservers.™

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sun microsystems

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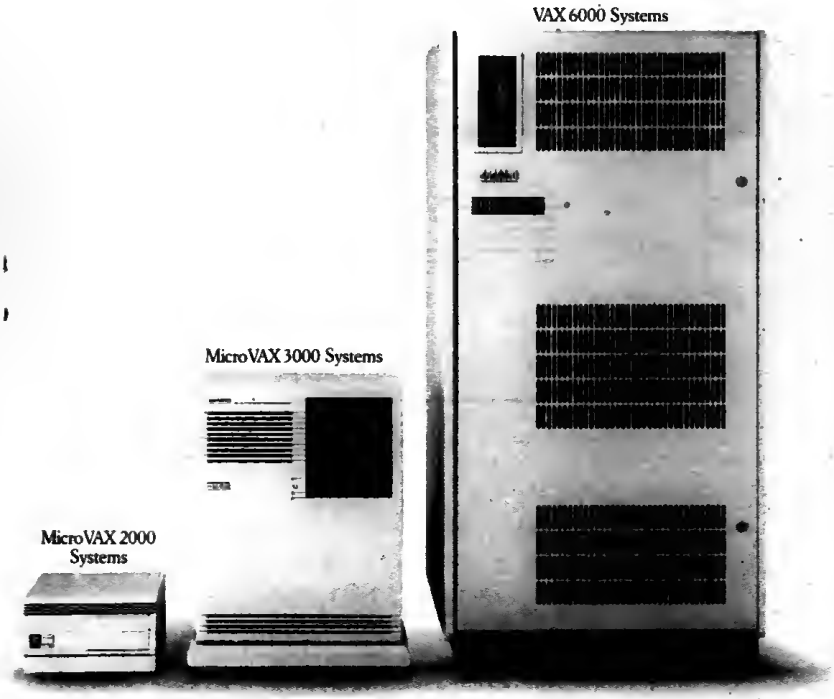

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REVIEWS

Wingz lands solidly on Apple spreadsheet turf

When Informix Software, Inc. announced Wingz, it brought some excitement to the Apple Computer, Inc. Macintosh spreadsheet market.

Wingz offers more features than most people will ever need. There are 20 basic chart types and graphics tools for drawing on the worksheet. You can display up to 16 million colors. Radio buttons and check boxes can be placed and programmed, pop-up menus can be placed in dialog boxes, and worksheets and text fields can be added and are scrollable.

In addition, the package comes with Hyperscript, a programming language similar to Hypercard's Hypertalk.

Unfortunately, some key features have been neglected. For example, you can directly import Lotus Development Corp. files but not Microsoft Corp. Excel or Ashton-Tate Corp. Full Impact files. Also, there are many menu commands, but few have command-key equivalents.

Worksheets can have a maximum of 32,768 rows and 32,768 columns.

One plus is that Wingz will address as much memory as you have in your computer.

Wingz provides plenty of tools for data analysis. There are 303 built-in functions divided into nine categories, including business, database, date/time, logical, numeric, spreadsheet, statistical and text. These functions can be pasted into a cell or script via a menu choice and dialog box. If you do not find the function you need, you can create your own using Hyperscript.

Wingz 1.0

Price: $395

- Performance: Satisfactory to excellent
- Documentation: Poor
- Ease of learning: Satisfactory
- Ease of use: Very good
- Error handling: Good
- Support: Satisfactory to very good
- Value: Excellent

For performing what-if calculations, one- or two-variable data tables can be set up. Once the data table and one or two of the

Continued on page 49

Borland buffs Paradox upgrade

Grooms QBE and table-oriented power, giving users a complete system

While everyone else has been busily working on SQL command syntax, Borland International has been enhancing the query-by-example (QBE) and table-oriented power of its Paradox database product.

Paradox 3.0 is a complete database development system with relational features. It includes a programming language called Pal, an applications generator called Personal Programmer, a QBE methodology and a Lotus Development Corp.-style menu interface. The program is oriented around row-and-column data tables: Data is displayed by default in such tables, and query results are displayed in answer tables.

New in Paradox 3.0 is the capability to graph data. The graph types include bar, three-dimensional bar, rotated bar, area, X to Y, stacked bar, pie, markers and combined lines and markers.

New in QBE are inclusive links and new Set operations, commands you use in QBE forms. One, the Or operator, makes a one-line query out of what previously took two or more lines. The operator As produces an answer table with field names you specify. You can now arrange columns in the answer table in any order you wish.

Borland's Paradox *offers a complete package*

Multitable data entry forms are one of the most useful new features in Paradox 3.0. Most databases that let you create such forms do so by making a copy of the forms you have already created and letting you combine them yourself. Paradox takes two data entry forms from different tables and superimposes the originals on one screen.

The multitable forms can show one-to-many relations and can show several records in one table in a scrollable region. Para-

Continued on page 49

Paradox 3.0

Price: $725

- Performance: Good to excellent
- Documentation: Excellent
- Ease of learning: Excellent
- Ease of use: Excellent
- Error handling: Very good
- Support: Satisfactory to very good
- Value: Excellent

Beginning PC users get Headstart

Headstart Technologies' Headstart line of IBM Personal Computer XT or PC AT-compatible systems is aimed at first-time computer users. The Headstart III is the midrange unit, a low-profile Intel Corp. 80286-based AT running at 8 or 12 MHz. It comes with a 32M-byte hard drive, a 3½-in. floppy disk drive and a 5¼-in. floppy drive. It also has built-in IBM Video Graphics Array (VGA), 1M byte of random-access memory and a three-button mouse.

The amount of software included with the Headstart III is amazing. It includes two tutorials, a VGA paint program, a business charts and graphs program, a what-you-see-is-what-you-get desktop publisher, a spreadsheet, a banner and specialty printing program and a number of utilities.

These programs go beyond the needs of the beginner. A menuing environment gives access to all applications. You can start with a beginner's environment and switch to an advanced mode to get the most features.

With its 12-MHz processor, Headstart III rates right where it should for its class. The 32M-byte hard disk was impressive. It featured a 28-msec access time and 1-to-1 interleave.

Headstart Technologies' *line targets novices*

The system breezed through the software and hardware compatibility tests. Headstart Technologies claims OS/2 compatibility with 2M bytes or more of RAM. In hardware, both the Ethernet and Token-Ring local-area network cards ran diagnostics with no problems. We also installed a Hayes Microcomputer Products, Inc. internal Smartmodem 2400B and an Intel Aboveboard — both ran well.

Headstart's slim, low-profile system design has a price in expandability. Although there are six slots overall, only three full-length 16-bit slots are open after accounting for drive controllers, video and memory card. There are four half-height mounting positions available. Headstart comes with one parallel and two serial ports, along with a joystick port and mouse port. With additional boards, you can put up to 3M bytes of memory on the system. The Headstart III will also support an 80287 math co-processor.

Documentation is included for every software program. For the system itself, there is a user's guide covering hardware setup and the Headstart advanced and beginner's environments. A quick setup foldout is the most helpful document overall. Software error messages are listed and discussed, but no guidelines are given for potential hardware trouble.

Setup could not be any easier. VGA is built-in, and the mouse is ready to go. Once the Headstart is plugged in, you boot to the first of six disks that contain all the applications and MS-DOS and follow the simple instructions for formatting the drive and installing MS-DOS and the remaining programs.

Using Headstart is almost as easy as plugging it in. Once again, part of this is because of the outstanding software. The environments prevent you from having to deal directly with MS-DOS unless you want to and give you easy access to the tutorials, applications and utilities.

The Headstart front panel contains an On/Off switch, recessed reset button, power-on light, hard-disk light and turbo light. The only glitch is that there is no way to lock the case or keyboard.

The Headstart III's outside case is made of sturdy plastic. Since the expansion boards lie on

Continued on page 50

Headstart III

Price: $2,995

- Performance: Good to excellent
- Documentation: Very good
- Setup: Excellent
- Ease of use: Very good
- Serviceability: Good
- Support: Good to very good
- Value: Very good

Package offers protective solution

REVIEW

If you have developed a slick Lotus Development Corp. template for distribution and cannot figure out how to protect the proprietary formulas, Resource Analysis International Corp.'s Compile 1-to-C is one solution. In addition, the user does not need a spreadsheet package to run the templates.

To use 1-to-C, you boot the program and point to the spreadsheet file you want compiled. 1-to-C converts the spreadsheet to a series of C-language source-code files and then compiles, links and assembles them. The result is two files: a data overlay file and a formula overlay file. Two runtime modules do the work. One is optimized for a math coprocessor; the other is used if there is no math coprocessor. No separate C compiler is required.

1-to-C's configuration utility lets you create unique title screens for each user and preconfigure your spreadsheet for specific hardware. A built-in debugger lets you test the macros on your compiled spreadsheet.

You can disable user access to any option on the menus and submenus except Quit. In extreme cases, you can disable all menu options and run the spreadsheet entirely from macros.

Compile 1-to-C is almost entirely compatible with 1-2-3. It takes a lot longer to compile, but its execution speed is blazing.

Performance was tested in several cases with three files. As a real-world test, a sanitized version of a 135K-byte template containing an ordinary mix of data and formulas was used. Macros were tested separately. As a stress test, a 239K-byte single-column file consisting of one data cell (A2) and 8,191 formula cells was tried, thus filling the spreadsheet with the maximum possible number of rows. Also, files generated by spreadsheets were loaded to produce 1-2-3-compatible files and a public-domain tax worksheet with a circular reference error.

That fast

1-to-C converted a real-world file in eight minutes. When the extreme stress-test file was thrown in, it compiled it but was uriable to load the results. When five rows were cut, it worked fine. However, this file took nearly an hour to compile and produced oversized result files.

1-to-C is completely compatible with almost all macros. It also handled some imported spreadsheets without a hitch. This level of macro compstibility helps reduce editing dramatically, which in turn helps cut down the number of spreadsheet recompiles. 1-to-C also does a good job of tracking down problem macros.

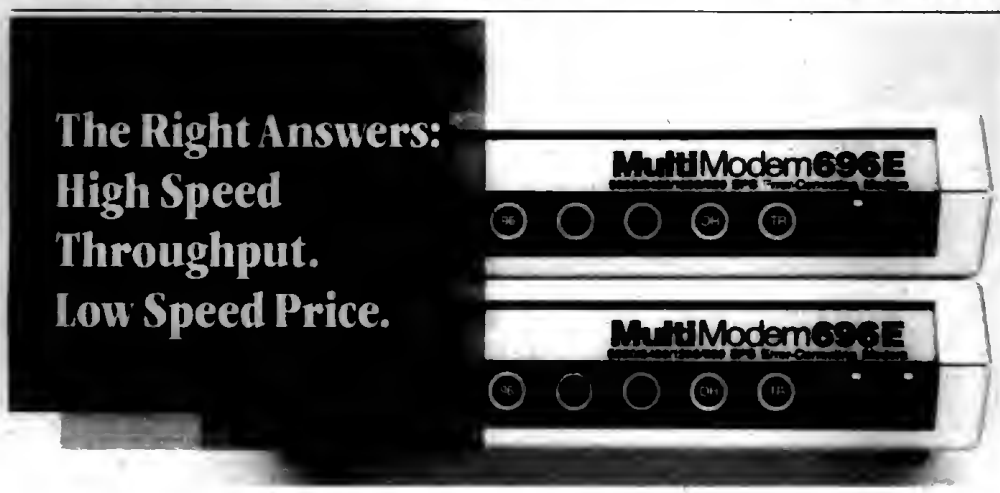
Compile 1-to-C comes with a softcover, ring-bound manual featuring a good assortment of illustrations showing screen displays and command trees. There is no tutorial, on-line Help or quick-reference card. If you are reasonably proficient with Lotus, expect to spend about an hour after installing the program on your hard disk before compiling your first spreadsheet.

Your compiled spreadsheets are safe from just about anything short of erasure. The only thing you want to watch for is the feature that lets you disable menu options: Once these are eliminated, they can be retrieved only by recompiling the spreadsheet from its original form.

The vendor offers a 30-day money-back guarantee on Compile 1-to-C. Unlimited toll-free technical support is provided.

In a series of calls to technical support, the first call was answered immediately, and the technician was helpful and knowledgeable. On subsequent calls, a receptionist took a message, and the callback came a few days later, after the problem had been solved.

Compile 1-to-C is simple to use, capable at what it claims to do and is thoroughly 1-2-3-compatible. The product sells for $299, which includes authorization for 10 distribution disks. An unlimited-use corporate version is available for $899.



The New MultiModem696E
Truly Affordable 9600 bps dial-up communications

If you're like many PC users, you've probably thought about taking advantage of the new 9600 bps modems now on the market, and decided against it because of their high prices.

Well, wait no longer! Multi-Tech's new **Multi**Modem**696E** is designed specifically for PC and asynch terminal users, at a price that is surprisingly affordable.

By the effective use of the MNP® Class 6 protocol with fast line turnaround, the **Multi**Modem**696E** gives you full duplex operation.* This technique is ideal for interactive terminal and personal computer applications, and when combined with the modem's MNP® Class 3/4 error correction and Class 5 data compression, yields throughputs far greater than its 9600 bps rated speed! Error free!

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Wingz

CONTINUED FROM PAGE 47

input cells have been defined, you can experiment with different values. In calculation speed, Wingz showed very uneven performance.

You can designate any range as a database in Wingz — the only requirement is that the first row contain the field names. Data can be imported from an existing database or text file in the standard tab-delimited format; comma-delimited format is not supported.

Wingz provides up to 256 assignable sort keys. It can find all records that match your search criteria, highlight them and extract them to create a new database range.

Graphics ease

With Wingz, you can create graphics right on the spreadsheet using the five drawing tools provided, by importing an image or by using the chart tool. An object can be filled with a pattern from a palette of 39 colors, including solid black and white. Although they cannot be edited once they have been placed, graphics can be resized and distorted.

Wingz provides 20 basic chart types, including bar, line and pie. They can appear as two- or three-dimensional and can be customized. Scientific chart types are also provided in the package. In addition, you can show graphs and text simultaneously.

The Hyperscript programming language lets you create scripts that can be attached to buttons, menu selections, worksheets or fields, which can be interactive or event-driven.

Unfortunately, Hyperscript does not include a debugger to detect logic errors. On the other hand, when a script is saved, it is automatically checked for syntax errors and compiled, and any syntax errors are immediately brought to your attention via an alert box. You are unable to save the script until the error has been corrected.

The Wingz documentation consists of a user's guide, reference manual and a disk-size quick-reference card. There is a five-page Read-Me file on one of the program disks detailing corrections and additions to the documentation.

Experienced spreadsheet users will be able to fire up Wingz and start working right away, but novices will find the going a little bit rough. Once you know how to use it, Wingz offers a number of features to make the spreadsheet easy to manipulate.

Wingz is memory-based, and no Autosave feature is provided, making it quite easy to lose data. When you close a file, however, Wingz prompts you to save. In addition, it supports a single-level Undo feature.

Technical support is unlimited, though calls are not toll-free. The company also offers bulletin-board support. Technical support calls were all answered promptly, and the technicians were knowledgeable about the product.

Wingz, Excel and Full Impact all have the same list price of $395. Considering its special presentation features, Wingz is a nice replacement for Excel, but unless you have a serious need for higher end presentation-quality graphics, hold onto an investment in Full Impact.

Borland

CONTINUED FROM PAGE 47

dox 3.0 automatically maintains referential integrity by preventing you from deleting records in the master form that have links to secondary forms.

Paradox 3.0 imports data from Lotus' 1-2-3 and Symphony; Ashton-Tate Corp.'s Dbase II, III and III Plus; IBM's Display Information Facility; ASCII delimited and fixed-field; PFS:File; Quattro; and Reflex file formats.

You don't create reports with Paradox; you customize them. The capability to start from scratch is there, but the default reports are better than the ones you might have etched out longhand ou other products.

Paradox has improved its programming language by adding string manipulation commands. You can combine programming commands with keyboard macros, and you can even create cut-and-paste routines that make it easier to move record and field data around, even outside an application.

Like the product itself, the manual seems to address the gamut of database users without slighting anyone. The documentation is clearer than it was in Paradox 2.0: it takes a stronger, more personal approach to getting you up and running.

Paradox shows that immediate productivity is possible in a database without having to enroll in a programming course. The least-ambitious user can hit one function key to get a data-entry form and another for a report. The most ambitious can use programming commands that you will not even find in the competition's supplementary programming libraries.

Paradox 3.0 is easy to use. Menus, instant forms, reports, graphs and crosstabs provide access to power and productivity that would require learning considerable command syntax in most other products and programming in some. The product continues the error-handling features of its predecessor, including incremental Undo of the current edit session, elaborate password protection, data encryption and data validity checking.

Borland provides a 60-day money-back guarantee. Free (but not toll-free) telephone support is available from Monday through Friday, 7 a.m. to 4 p.m. Pacific time. At $725, Paradox 3.0 is a real crowd-pleaser. No matter what your level, it will probably take you half the amount of time you usually spend learning a new program to become productive.

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PC Magazine, 10/31/88

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Headstart

CONTINUED FROM PAGE 47

their sides, the system has a slim profile. Three long wires were added to the top of the board and four underneath. On the positive side, all the boards and drives are well secured in the case. Drive cables are kept short and some are clipped down, making it easy to troubleshoot potential drive troubles or add a third drive.

Headstart Technologies offers an 18-month warranty. Authorized service centers handle all repairs. Toll-free technical support is provided Monday through Friday from 6 a.m. to 5 p.m. Pacific time.

Priced at $2,995, the Headstart III comes loaded with features.

NEW PRODUCTS

Systems

Advanced Digital Corp. has introduced two IBM Personal Computer AT compatibles that integrate all electronic components on a single printed-circuit board, the vendor said.

The Powerlite System 286 and Powerlite System 386SX PCs can reportedly be used in a stand-alone, workstation or local-area network capacity, and each is compatible with the MS-DOS and OS/2 operating environments. The systems come standard with four slots and a 3½-in., 1.44M-byte floppy disk drive.

The Powerlite System 286 is priced at $2,195, and pricing for the Powerlite 386SX begins at $2,395.

ADC
5432 Production Drive
Huntington Beach, Calif. 92649
714-891-4004

An Intel Corp. 80386SX-based desktop personal computer has been introduced by Mitsubishi Electronics America, Inc.

Designated the MP386S, the system reportedly operates at 16 MHz with zero-wait states and offers support for multitasking applications. The standard configuration includes six 8/16-bit expansion slots and 2M bytes of random-access memory, expandable to 8M bytes on the motherboard and 16M bytes with additional memory boards. A 5¼-in., 1.2M-byte or 3½-in., 1.44M-byte/720K-byte flexible disk drive is provided, the vendor said.

Pricing ranges from $2,995 to $3,995, depending on configuration.

Mitsubishi Electronics
991 Knox St.
Torrance, Calif. 90502
213-515-3993

NCR Corp. has introduced a 25-MHz Intel Corp. 80386-based personal computer designed for use in multiuser, multitasking environments, the company said.

The NCR PC925 can reportedly be configured as a network workstation or as a server in a local-area network and can perform large spreadsheet, extensive database management and artificial intelligence applications.

The computer offers 64K bytes of cache memory, a small computer system interface fixed-disk controller and 4M bytes of standard random-access memory.

Five half-height drive positions and six expansion slots are available, and the system is priced from $8,950 to $14,295, depending on which configuration and options are used.

NCR
1700 Patterson Blvd.
Dayton, Ohio 45479
513-445-5000

Software applications packages

Great American Software, Inc. has introduced a new pricing structure and a bundled version of its One-Write Plus small business accounting software.

The software includes general ledger, accounts receivable, invoicing, accounts payable and other functions.

Previously available in four modules priced at $250 each, the software will now be sold at two price points, the vendor said.

The bundled version will cost $299, and the price for the individual modules has reportedly been reduced to $149, according to the company.

Great American Software
9 Columbia Drive
Amherst, N.H. 03031
603-889-5400

A compact disk/read-only memory (CD-ROM) software system that produces commercial quality information products in-house has been announced by Knowledge Access International.

The Kaware Disk Publisher incorporates five software packages for creating electronic publications on CD-ROM, write-once read-many or floppy disks, according to the vendor.

The software offers support development for full-text, fielded data, image file or graphic information retrieval. An IBM Personal Computer or compatible with 640K bytes of random-access memory is required.

The software is priced at $795, with site licenses and quantity discounts are available.

Knowledge Access International
Suite 1305
2685 Marine Way
Mountain View, Calif. 94043
800-252-9273

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War For This Im

To all those unlucky enough to be stuck smack in the middle of the current spreadsheet confusion, take heart.

There is, at last, a viable alternative to war: revolution.

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Plus, SuperCalc5 actually makes productivity easier. An integrated Undo feature simply reverses unwanted commands. And a truly comprehensive system of debugging highlights costly errors and analyzes macro logic.

Perhaps even more impressive is the way SuperCalc5 can link spreadsheets. Up to 255

Catch bugs before they come back to bite you.

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he Spreadsheet portant Update.

to be precise. Linking either in memory or on disk, either pages of the same spreadsheet or independent, either SuperCalc5's files or Lotus® 1-2-3®'s.

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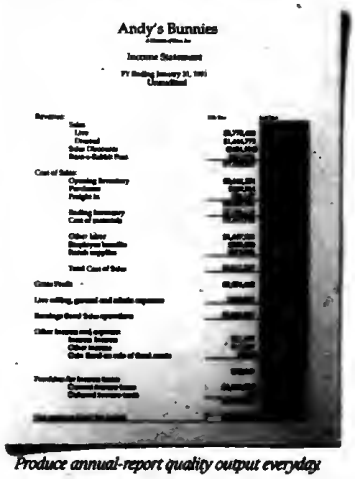

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Which now brings us to the "E" word. Unlike Excel, SuperCalc5 runs on all IBM® and compatible computers but also takes full advantage of 286 and 386 machines when *you* decide to make that transition.

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Which finally brings us to our admittedly biased outlook for the much touted spreadsheet war.

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Macs take back way into federal market

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Two major obstacles to Apple Computer, Inc. making further inroads into the federal market are a government bias in favor of MS-DOS machines and Macintosh sticker shock, according to federal user group officials who spoke at last month's Macworld Expo/Washington, D.C. '89.

Macintosh enthusiasts "sometimes have to call it a 'calculator' or 'graphic workstation' or some other phony name to get it in the door," said Maj. Steve Broughall, president of the Pentagon Macintosh Users Group.

A recent inquiry showed that one network designed for IBM Personal Computers actually had more than 900 Macintoshes connected "on the sly," according to David Lavery, deputy manager of automation and robotics at the National Aeronautics and Space Administration.

The backdoor methods are used because some agencies have established MS-DOS micros as agency standards, such as the U.S. Air Force contract with Zenith Data Systems [CW, Aug. 8, 1988]. Others have written specifications in such a way that Apple is locked out of the bidding competition.

A RECENT INQUIRY showed that one network designed for IBM Personal Computers actually had more than 900 Macintoshes connected "on the sly."

Apple's Reston, Va.-based Federal Systems Group often lobbies for revisions in specifications that initially exclude the Macintosh. Phillip M. Dunkelberger, Apple's federal marketing manager, said he would prefer specifications that describe the end-user functions the agency wants rather than overly detailed specifications that could exclude Macintosh technology.

In addition, he said, agencies should evaluate life-cycle costs such as inputting data, printing, hardware failure rates and training. Users said the high price of the Mac II, compared with IBM PC clones, is a barrier in the federal market, although the IBM PC clones may be the most cost-effective option for users who require only word processing.

Thomas Warrick, past president of the Washington Apple Pi user group, said that many agencies use the Macintosh in graphics-oriented applications such as desktop publishing and presentations. But use of the Mac as a general-purpose computer has come more slowly, he said.

Warrick predicted that virtual memory, a multitasking feature that Apple has promised to include in its System 7.0 release this year, will give Macintosh a competitive edge in the federal market.

Apple's share of the federal market has grown to 6%, but it is still dwarfed by Zenith and IBM, according to Computer Intelligence, a market research firm in La Jolla, Calif.

At Macworld/Washington, Apple got a boost in its efforts to penetrate the market when a third-party developer announced a secure version of Apple's A/UX operating system. Secureware, Inc. in Atlanta said that a security module for A/UX is under evaluation by the National Computer Security Center (NCSC) and the Defense Intelligence Agency.

Apple's Dunkelberger said the development is important because Apple previously has been locked out of procurements at defense and intelligence agencies, which require trusted operating systems approved by the NCSC. "They're not open to us without that ticket punched," he said.

So far in 1989, federal agencies have issued bid requests that call for 100,000 secure workstations, according to Michael C. Chesney, chief executive officer of Secureware.

The security module is designed to comply with the Defense Intelligence Agency's Compartmented Mode Workstation standard, which combines the X Window System interface with the Class B1 trusted system requirements developed by the NCSC. A B1 rating requires discretionary and mandatory access controls and the production of an audit trail.

The trusted A/UX operating system can run several X Window sessions simultaneously at different security levels while maintaining strict separation of compartmented data, Chesney claimed. The workstation system is based on Secureware's Security Module Package Plus, a portable security enhancement system licensed to Unix hardware vendors.

Also at Macworld/Washington, Atlantic Research Corp. announced a Tempest version of the Macintosh IIX. The Tempest model is priced at about $13,000, and shipments will begin in July, according to the Alexandria, Va.-based vendor.

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PC software system maps out Arizona highway plan

BY MICHAEL ALEXANDER
CW STAFF

PHOENIX — When the Arizona Department of Transportation (ADOT) decided that the time had come to design and build 232 miles of freeway surrounding Phoenix, it knew that it would need more than manpower and $6 billion to do the job.

ADOT enlisted the aid of four management consulting firms — and intends to hire four more —to provide project-design and construction services.

ADOT also charged De Leuw, Cather & Co., one of the four management consultancies that it had selected, with developing a computerized decision-support system that would provide ADOT with standardized reports, improve communications between ADOT and its consultants and enhance the capability of compiling information for ADOT.

"Because of the amount of work involved and a lack of personnel, we took over some of the responsibilities that ADOT would have normally handled," said Scott Staley, a project scheduler at De Leuw Cather. "We helped them decide where the freeways would go, set up public relations meetings to explain the program's impact on individual communities and several other jobs."

De Leuw Cather's primary responsibility is to oversee the design and construction of the 55-mile Outer Loop 101 Aqua Fria/Pima Freeway project north of Phoenix.

The firm monitors hundreds of daily design and construction details having an ongoing impact on how the Outer Loop 101 Freeway will be designed and constructed, from subconsultant designs to right-of-way land acquisitions.

Transport 1 *paves the way in Arizona*

De Leuw Cather devised a computer system, dubbed Transport 1, designed specifically for roadway project management, that includes three integrated database programs, a wide-area communications program and dozens of templates designed for roadway project management. The combination of programs is unique because it offers project managers full-function database management and graphics capabilities and enables them to work with a wide variety of project-related information in a standardized format.

Transport 1 runs on Apple Computer, Inc.'s Macintosh Plus, Mac SE and Mac II computers equipped with a hard disk drive. The firm also recommends using an Adobe Systems, Inc. Postscript-compatible laser printer and a modem.

Among the programs and templates in the package are the following: Marvelin Corp.'s Business Filevision and Acius, Inc.'s 4th Dimension, both of which are database programs; Connect, Inc.'s Governet, a communications program; Mediagenic's Focal Point; and an Apple Hypercard application that has been modified to allow an end user to launch into specific functions in the other programs in the package.

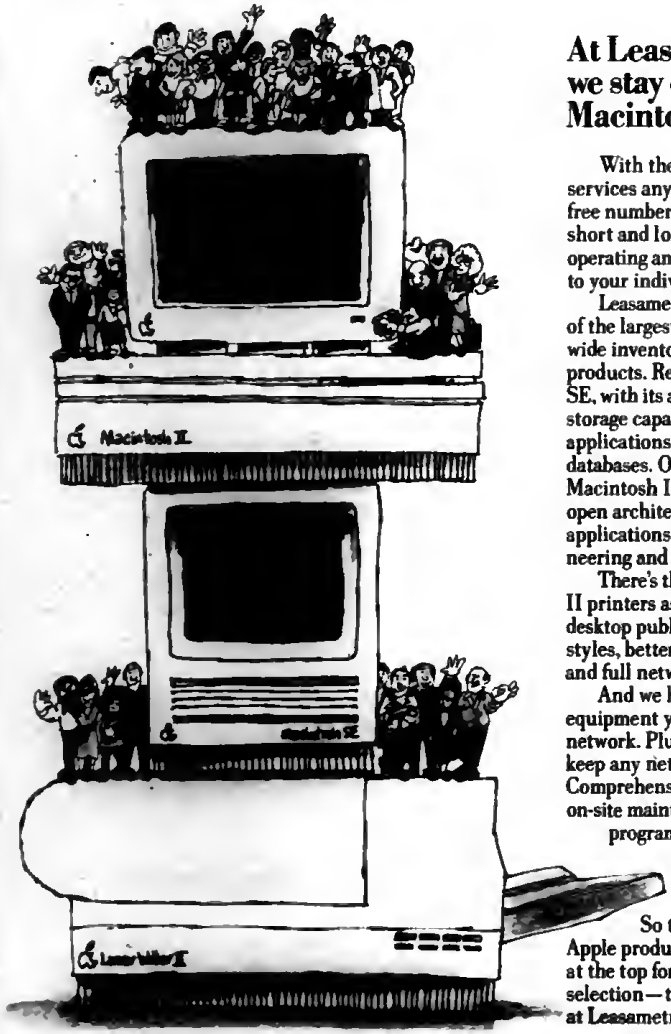
With templates that run off Business Filevision, a manager wanting current information on a right-of-way parcel can call up an Outer Loop 101 Freeway right-of-way map graphic and then begin to peel away layers of maps, each one more detailed than the next. With templates that run off 4th Dimension, a manager can quickly prepare bid schedules and engineering estimates, track the progress on any number of projects or monitor the status and cost of land acquisition needed to complete a roadway project.

"We put together this system to oversee this massive freeway construction," Staley said. "We have to funnel information to the clients, in written reports or else in computer graphics files, and we wanted something that would be impressive."

Some of the benefits of the system, which has been adopted by three out of the four consulting firms currently working on the project, have been improved communications between ADOT and the consultants, creation of a central location for charts, tables and other information and standardized report styles and formats, the firm said.

The system far exceeds any capability that ADOT currently has to do the job internally, said Richard Strange, Outer Loop right-of-way and utilities coordinator at ADOT. "From our point of view, it has been a godsend."

Eventually, all of the management consultancies will be tied together so that all of the information is accessible by everyone, Strange added.



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23 Dir. Mgr. Supv. Analyst of Systems
31 Dir. Mgr. Supv. of Programming
32 Programmer, Methods Analyst ?
09 Dir. Mgr. Supv. OA/WP
38 Data Comm. Network/Systems Mgr.

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12 Vice President: Asst. VP
13 Treasurer, Controller, Financial Officer
41 Engineering, Scientific, R&D, Tech. Mgt.
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65 Communications Systems/Public Utilities/Transportation
70 Mining/Construction/Petroleum/Refining/Agric.
80 Manufacturer of Computers, Computer-Related Systems or Peripherals
85 Computer & DP Services including Software/Service Bureau/Time Sharing/Consulting
90 Computer/Peripheral Dealer/Distributor/Retailer
75 User: Other _____
95 Vendor: Other _____
(Please specify)

2. TITLE/FUNCTION (Circle one)
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21 Dir. Mgr. Supv. IS/MIS/DP Services
22 Dir. Mgr. Supv. of Operations, Planning, Adm. Services
23 Dir. Mgr. Supv. Analyst of Systems
31 Dir. Mgr. Supv. of Programming
32 Programmer, Methods Analyst
09 Dir. Mgr. Supv. OA/WP
38 Data Comm. Network/Systems Mgr.

OTHER COMPANY MANAGEMENT
11 President, Owner/Partner, General Mgr.
12 Vice President: Asst. VP
13 Treasurer, Controller, Financial Officer
41 Engineering, Scientific, R&D, Tech. Mgt.
51 Sales/Mktg. Mgr.

OTHER PROFESSIONALS
60 Consulting Mgr.
70 Medical, Legal, Accounting Mgt.
80 Educators, Journalists, Librarians, Students
90 Others _____
(Please specify)

3. COMPUTER INVOLVEMENT (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor, or consultant
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B Minicomputers/Small Business Computers
C Microcomputers/Desktops
D Communications Systems
E Office Automation Systems
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Barney

CONTINUED FROM PAGE 43

grammers should go ahead and provide all the nifty features they dreamed up in their Pepsi- and pizza-induced frenzy. The trick is to provide a timing mechanism that will shut off the feature if it is not used within two weeks of purchase. This, I believe, actually came from a software vendor who is probably afraid to use this very fine idea.

Eventually, common personal computers will grow up enough to handle the hundreds of esoteric features currently being turned to code. But until then, it might be more satisfying to stick with the vintage stuff.

Extended Edition, quietly awesome. OS/2 Extended Edition is such a low-key product, you would think IBM was ashamed of it. I have never seen an ad for IBM's OS/2 Extended Edition. Nor has IBM rallied high-profile software vendors to tout the thing. In short, IBM has failed miserably to hype it or answer criticisms that the product is slow, proprietary and danged ugly to look at.

That is why OS/2 Extended has a bright future. MIS has not been besieged with OS/2 Extended overkill. Instead, IBM has quietly demonstrated a product that promises to solve many MIS database and connectivity problems at a price that nearly anyone could live with.

We recently asked nearly 200 high-level MIS people and found that 58.2% of those planning to use a local-area network database server (other than SQL Server) plan to use Extended Edition.

Maybe those in search of sales should cool down, cut the hype and start selling some products. It isn't fair that laid-back IBM gets all that business.

Say what? A quick call to Microsoft recently for reaction to Quarterdeck's windowing patent brought a novel response. The company had not yet gone through the materials but was sure that *its* products did not infringe. I guess Microsoft really is a visionary company.

Babies and keyboard shortcuts. Most people think of keyboard shortcuts as being the domain of grizzled old power users who know the software inside and out. Wrong. Keyboard shortcuts are actually for babies who don't have the patience to type in a command or pull down a menu and make the proper selection.

Take my daughter for instance. She's almost 6 months old and has already made Samna's Ami do things I've never gotten it to do. Lauren was invoking menus, centering text, typing gobbledygook, pulling up style sheets and even shut down the application, all with some simple keyboard pounding. That software was doing cartwheels.

The trick was to hold down the Alt key while simultaneously whaling on other keys. She steered clear of the mouse and never even needed Help.

Next time, she promises to give me a lesson on macros.

Barney is a *Computerworld* senior editor, PCs & workstations.

Alphatronix utility supplies DEC-IBM link

BY SALLY CUSACK
CW STAFF

RESEARCH TRIANGLE PARK, N.C. — An erasable optical disk software utility that provides interchange between Digital Equipment Corp. workstations and IBM Personal Computers and compatibles was introduced last week by Alphatronix, Inc.

The 2-year-old North Carolina-based company released Bypass software for use with the company's Inspire removable erasable optical storage subsystem. The software allows users to read and write data between Digital Equipment Corp. VAX/VMS workstations and personal computers using MS-DOS.

According to Robert Freese, president of Alphatronix, Bypass was designed as distribution media to use standard disk structures. With Bypass, the data stored on a DEC workstation under VMS can be written to a removable, erasable optical disk in a DOS file format for users with a PC-based Inspire system, he said.

Bypass costs $1,100 for a VAX and $750 to $1,000 for PCs.

Bypass automatically detects whether the inserted disk is formatted under the same file structure as the host or the native operating system. It can list the contents of the directory on a foreign disk and copy the data from a foreign optical disk to a native disk.

The Inspire subsystem, which began shipping in August, has an installed base of approximately 1,000 spindles, both single and dual, according to the vendor. The system uses 650M-byte, 5¼-in. magneto-optic erasable optical media.

Bypass for the Sun workstation environment is scheduled to be released this fall, and versions supporting Apple Computer, Inc.'s Macintosh and Apollo Computer, Inc.'s workstations are slated for shipment at the end of this year and in the first quarter of 1990.

The firm plans delivery of Unix and OS/2 versions for PCs, but Unix development has been given a higher priority.

Do they call it a h
it's so hard to find wh

Every DP/MIS manager is concerned with PC productivity and about getting the most out of the systems and software your company already has. But as more data gets stored in PCs, how efficient can users be if they spend most of their time looking for information, rather than using it?

Which is why you should know about Magellan®. The first utility that helps you find and organize your files by letting you

[1] Applications supported in SpeedView include Lotus 1-2-3, Symphony®, Manuscript®, Agenda®, WordPerfect, dBase®, MultiMate®, Microsoft® Word, WordStar®, DisplayWrite, all ASCII files, plus many more
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Extender

CONTINUED FROM PAGE 43

ly burst in March, when Lotus Development Corp. acknowledged what had been rumored for months: 1-2-3 Release 3.0 will require OS/2 or a DOS extender to run properly.

While many viewed the announcement as an admission of technological failure, others saw a bold move to bolster DOS extenders and unleash the untapped power of countless millions of IBM Personal Computer ATs and compatibles.

Lotus tapped Rational Systems, Inc. and reworked Release 3.0's C code to take advantage of Rational's DOS/16M. Database server vendor Gupta Technologies, Inc. already has its SQLbase running under DOS/16M.

When Release 3.0 ships, users with as little as 1M byte of memory will be able to break free of the 640K-byte constraints of MS-DOS.

In addition, they can also use up to 16M bytes of memory for code and data. And for users of memory-squeezing terminate-and-stay-resident programs, the programs can be loaded into low memory while 1-2-3 Release 3.0 runs in high memory.

Release 3.0 will also support the "bank-switching" approach to memory relief available from the Lotus/Intel/Microsoft Corp. Expanded Memory Specification (EMS), but officials from both Lotus and Microsoft have said that EMS is less efficient than the newer DOS extender technology.

Even OS/2 creator Microsoft is set to back DOS extenders. The upcoming version of Windows will efficiently access protected mode, allowing Windows applications to use the large memory space of the 80286 and Intel 80386 processors.

Database vendors have been quick to jump on the DOS extender bandwagon because their applications tend to work with large sets of data. So far, Borland International has extended Paradox with the help of the Phar Lap 386/DOS Extender, and Informix Software, Inc. has extended its Informix-4GL with the help of Rational's DOS/16M. Oracle Corp. uses its own proprietary technology to extend its Professional Oracle.

Squelching conflicts

The thing that frightens PC users more than anything is incompatibility and the possible loss of data. This very fear has prevented many from adopting DOS extender technology. Now, extender vendors are trying to nip these fears in the bud with a coalition of seven software companies pushing a specification called the Virtual Control Program Interface (VCPI).

This group recently received a boost when Lotus Development Corp. joined other members Phar Lap Software, Inc., Quarterdeck Office Systems, Inc., A.I. Architects, Inc., Quadram, Inc., Qualitas, Inc. and Rational Systems, Inc.

The group aims to avert conflict between software packages that exploit specific features of 80286 and 80386 chips. With VCPI, programs that work in protected mode (accessing up to 16M bytes of memory) should not conflict with 386-specific programs that use the Virtual 8086 mode to run multiple MS-DOS sessions. The Virtual 8086 mode is an increasingly popular way to multitask current applications.

Without VCPI support, users must shut down their 386 Control programs to run a protected mode package. Intel and Compaq Computer Corp. attended the latest meeting but have so far declined to join the group. Microsoft declined to attend the latest meeting, said Phar Lap President Richard Smith.

Next

CONTINUED FROM PAGE 43

However, she hopes to get credit for the course once she finishes a final project. The difficulty of the class has not dimmed her enthusiasm for Next, she said.

The Next workstation has superior online documentation for programmers, an interface builder that allows the programmer to assemble an array of objects and a graphical user interface that Kreyenberg said she finds easier to use than the Mac's interface.

Stanford users have discovered bugs in the Next workstation's system software. Next recently brought out Release 0.9 of the Next operating system, which students say corrected many of the problems with the first version.

"There were a lot of general crashes with the first release which couldn't be attributed to any cause," said Eric Rose, a computer science undergraduate. Rose found bugs in the scrolling feature, the keyboard and the machine's sound capabilities that froze the unit at times. Those difficulties have been resolved in Release 0.9.

"When we took this machine, I knew we were taking on a beta product," Loving said. "The operating system is not at Release 1.0 yet."

ard disk because at you're looking for?

see their contents as they appear in your favorite applications. Without even having to load the specific applications that created the file.

Unlike most utilities, Magellan is designed for every level of PC user. Everything you need to run the program is on the screen right in front of you. Which means that there is virtually no learning curve. And from a DP/MIS manager's point of view, Magellan saves you time in end user support.

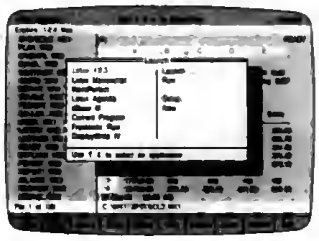
To find specific information with Magellan, all you need is a general idea of what you're looking for. The Magellan Explore function can perform a search across your hard disk or network on a phrase, a topic, an idea or even an entire file. Not just key words.

The Magellan Explore and SpeedView functions let you locate everything related to a particular topic and see it as it would appear in its native application

Then it lists your "found" files on the left of your screen in order of how relevant the contents are to the search topic.

As fast as you can scroll down this list, the Magellan SpeedView function instantly shows the entire contents of each file on the right of your screen, highlighting relevant text for you.

Using the information is easiest of all. Because all it takes is one keystroke to launch into the application that created the file, and it will be loaded and ready to go.



With one keystroke, Magellan loads the selected file and application, in this case 1-2-3, so you're ready to go to work

Or you could use Magellan to gather the information you choose from several different applications (like a 1-2-3® spreadsheet and a WordPerfect® memo)[1] and put it into a single file so you can start using it right away.

Call 1-800-345-1043 for your free Magellan Demo kit. Ask for ALQ-3593 to learn more on why Magellan is the quickest, easiest way to access all the information on your hard disk.

Remember, PCs were supposed to make users a lot more productive. With Lotus Magellan, they can be.

Introducing Lotus Magellan

[1]International 1Base and MultiMate are registered trademarks of Ashton-Tate Corporation. WordStar is a registered trademark of Micropro International Corporation. Microsoft is a registered trademark of Microsoft Corporation.

NEW PRODUCTS

Development tools

An automated software testing system has been announced by Atron, a division of Cadre Technologies, Inc.

Called the Atron Evaluator, the product requires two or more IBM or compatible personal computers for software testing — one to act as the host computer and the other to act as the target. Keystrokes are automatically recorded on the target computer and transmitted back to the host to compare actual screen response with expected response, the vendor said.

The Atron Evaluator consists of two expansion cards, a set of cables, software and documentation. It costs $5,000.

Atron
Saratoga Office Center
12950 Saratoga Ave.
Saratoga, Calif. 95070
800-283-5933

Production Systems Technologies, Inc. has announced Version 3.0 of OPS83, the company's rule-based artificial intelligence language.

Scheduled for release this month, Version 3.0 runs on OS/2 and MS-DOS computers, as well as systems from AT&T, Hewlett-Packard Co., Sun Microsystems, Inc., Digital Equipment Corp. and others.

The latest release enables expert systems applications to run significantly faster than previous versions, the vendor said, by incorporating Rete II, an enhanced version of the Rete match algorithm. The product is priced at $1,950.

Product Systems Technologies
5001 Baum Blvd.
Pittsburgh, Pa. 15213
412-683-4000

Mountain States Consulting has enhanced its DOS menu environment for IBM Personal Computer XTs, ATs and compatibles.

Version 1.2 of MSC-Menu reportedly includes password protection, color support and command-line function-key disabling capabilities. The software allows users to develop their own operating environment by replacing the DOS prompt with customized menus, according to the vendor. A hard disk is recommended but not required.

MSCS-Menu 1.2 is priced at $29.95.

Mountain States Consulting
P.O. Box 20326
Jackson, Wyo. 83001
307-733-1442

Training

Advanced Technologies International, Inc. has announced that it has signed an agreement with Fujitsu America, Inc. in San Jose, Calif., to market that company's five page/min. laser printer.

The Laserprint 0570 was reportedly designed for small business or workstation environments and offers a 300 by 300 dot/in. resolution. Additional features include Hewlett-Packard Co. Laserjet Plus emulation capabilities and a 16-in. footprint, the company said.

A fully configured unit is priced at $2,500 in quantity orders and is available immediately.

Advanced Technologies
355 Sinclair-Frontage Road
Milpitas, Calif. 95035
408-942-1780

Advanced Techologies' *Laserprint 0570 has a 300 by 300 dot/in. resolution*

Hewlett-Packard Co. has announced that its Paintjet color graphics printer is now capable of running with Autoshade software from Autodesk, Inc.

Autoshade reportedly allows users to generate three-dimensional shaded images and is used in conjunction with Autocad, Autodesk's personal computer-based, computer-aided design package.

The HP Paintjet thermal ink-jet printer reportedly produces letter-quality text at 167 char./sec. and is priced at $1,395. Autoshade software costs $500.

HP
3000 Hanover St.
Palo Alto, Calif, 94304
415-857-1501

IBM has introduced two Micro Channel Architecture-based industrial computers, the IBM 7541 and the 7561.

Both units are available as either bench-top processors or rack-mounted systems, and both use IBM's OS/2 software, the company said.

The 7541 is reportedly based on an Intel Corp. 80286 processor and offers a triple fixed-disk capacity of up to 30M bytes. Three expansion slots are standard. The system is priced from $4,700 to $5,200, depending on configuration.

The 20-MHz Intel 80386-based 7561 computer comes standard with four expansion slots and 2M bytes of main memory, expandable to 8M bytes. A 60M-byte fixed disk is also provided. Pricing ranges from $8,500 to $9,000. Both models are equipped with a rugged chassis and full-function keyboards.

IBM
1133 Westchester Ave.
White Plains, N.Y. 10604

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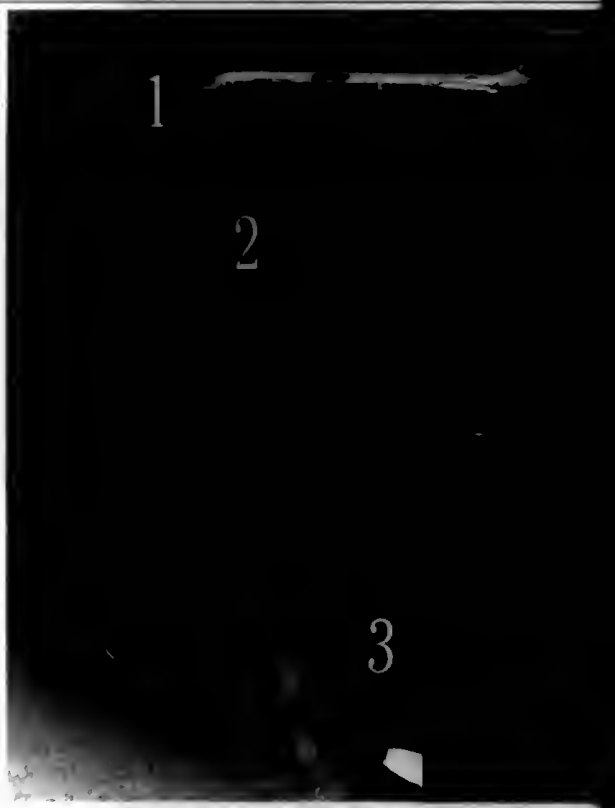


It might surprise you to learn that our own aerospace companies are among our biggest customers. But it's true. And it makes a lot of sense. We wouldn't have been able to develop such sophisticated products unless we developed

Data storage

Cumulus Corp. has announced a Stepping Stone kit for the IBM Personal System/2 Model 30/286.

The kit reportedly allows the slotless installation of the Stepping Stone 5.25 on the Model 30/286. The Model 30/286 is not shipped with an installed B-drive connector, and the kit was developed to fill that need, according to the company. It is priced at $50 and includes the necessary software drivers.

Cumulus
23500 Mercantile Road
Cleveland, Ohio 44122
216-464-2211

Kasei Memory Products, Inc., a U.S. subsidiary of Mitsubishi Kasei Corp., has introduced a line of double-density and high-density 3½-in. microcomputer floppy disks.

The products will be sold in packages of 10, and the double- and high-density disks will be priced at $24.50 and $45, respectively.

Each disk is put through a quality assurance test in a computer drive before it is accepted for packaging, the company said.

Kasei Memory Products
535 Independence Pkwy.
Chesapeake, Va. 23320
804-547-5477

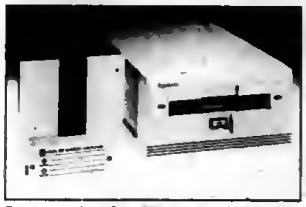
Two 5¼-in. write-once read-many optical disk drives have been introduced by Panasonic Communications and Systems Co.

The LF-5010 stand-alone model and the LF-5014 built-in unit are reported to be small computer systems interface (SCSI) removable cartridges that are capable of storing up to 470M bytes of data per side.

The devices work with the Apple Computer, Inc. Macintosh series, IBM Personal Computers and compatibles, Micro Channel Architecture for the IBM Personal System/2 and Xenix operating systems, the vendor said.

Scheduled to ship in June, the LF-5010 will be priced at $3,500, and the LF-5014 will cost $3,300.

Panasonic Communications and Systems
Two Panasonic Way
Secaucus, N.J. 07094
201-348-7000



Panasonic Communications' *5¼-in. WORM disk drive*

United Software Security, Inc. has upgraded its hard disk access control product.

Onguard Version 4.10 includes an enhanced system password routine and offers floppy boot prevention for multiple partitions, the vendor said.

The product reportedly runs on all hard disk IBM Personal Computer ATs, Personal System/2s and compatibles under PC-DOS or MS-DOS Versions 2.0 or higher.

It is priced at $295. Existing users may upgrade to Version 4.10 for $45, according to the company.

United Software Security
8133 Leesburg Pike
Vienna, Va. 22180
703-556-0007

Macintosh products

Radius, Inc. has announced a series of video interfaces developed specifically for Apple Computer, Inc.'s Macintosh II family.

The Directcolor series is used in conjunction with the company's Color Display product and is reported to be compatible with Apple's 32-bit Quickdraw standard.

The product line consists of the Directcolor/16 Interface and the Directcolor/24 Interface, which permit the manipulation of 16- or 24-bit images, respectively.

Pricing ranges from $3,695 to $4,995.

Radius
1710 Fortune Price
San Jose, Calif. 95131
408-434-1010

Aldus Corp. has announced the Aldus Pagemaker Color Extension software package, designed specifically for Apple Computer, Inc.'s Macintosh computer.

The program reportedly provides additional color capabilities for the company's desktop publishing software. According to the vendor, four output options are available, including color laser printers, black-and-white laser printers, image setters and high-end press systems producing four-color separations.

The software package requires a hard disk and Aldus Pagemaker 3.0 for the Macintosh.

The product is priced at $195.

Aldus
411 1st Ave. S.
Seattle, Wash. 98104
206-628-6594

Panasonic Communications and Systems Co. has introduced two monitors designed for Apple Computer, Inc. Macintosh machines.

The M1900M2 and the M1900ME are reported to be compatible with the Macintosh II and the Macintosh SE, respectively. Both units include Apple's Quickdraw interface package and have a resolution of 1,152 by 870 pixels with an 84 dot/in. density, according to the vendor.

Scheduled for availability in June, the M1900M2 will cost $1,969, and the M1900ME will carry a price tag of $1,999.

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DATA STREAM

Jeffrey N. Fritz

Cheap linkup strategies

People don't usually associate Integrated Services Digital Network with packet switching. However, routing X.25 transmissions over an ISDN B channel can make significant cost savings available to user sites — particularly when it comes to connecting multiple workstations with hosts.

West Virginia University is one example. As is true with most evolutionary systems, not much thought went into coordinating the data network. Actually, the university doesn't really have a central data network as such. It has many small, and in many cases isolated, data paths.

Most of these data links travel in the direction of the West Virginia Network for

Continued on page 69

User firm looks outward with ISDN

ON SITE

BY ELLIS BOOKER
CW STAFF

OGDEN, Utah — Come June 1, Nice Corp. will connect what up until now has been its private Integrated Services Digital Network (ISDN) to the outside world.

The telemarketing service bureau plans to attach one of its four Northern Telecom, Inc. Meridian SL-1 private branch exchanges (PBX) to an ISDN line from AT&T, becoming only the second customer to couple a Northern switch to AT&T's ISDN service.

Nice will use both the Call-by-Call and Information Forwarding 2 options being offered on AT&T's Primary Rate Interface (PRI) service.

With Call-by-Call, customers can reconfigure on demand any of the 23 64K bit/sec. channels in a PRI line into a mix of AT&T network services. This is more efficient than maintaining permanent and possibly underutilized facilities.

For example, a telemarketing operation such as Nice could make most of these channels outbound WATS lines during the day but then convert them to inbound 800 lines in the evening.

Information Forwarding 2, AT&T's automatic number identification service, sends the calling party's telephone number along with the call itself to the called party.

ID please

According to Nice telecom engineer and manager Rick N. Clements, the number identification feature will be the basis of a database application.

When a call arrives at Nice with the calling number data, it will be sent to the Ogden center, where Tandem Computers, Inc. and Hewlett-Packard Co. hosts containing customer records reside.

If a match based on the incoming telephone number is found, the customer's call and record will be sent simultaneously to a telemarketing operator's station.

Nice currently uses 20 T1 lines for inbound Megacom 800 services from AT&T. Clements said a PRI line will be connected June 1 to a Northern Telecom SL-1 XT in the Ogden facility for testing.

The in-house ISDN network, operational since last year, uses a private T1 line supplied by US West to link Nice's office here to a remote office in Provo, Utah, 90 miles away.

About 120 operator stations are connected to Ogden using two SL-1 XT PBXs. The voice/data link has been configured with four multiplexers: three running at 56K bit/sec. and one at 64K bit/sec. This approach is less expensive than maintaining separate data lines between the two locations, Clements said.

Another telemarketer, Watts Marketing of America in Omaha, announced last September that it intended to use a Meridian SL-1 and an AT&T PRI line in a number identification application.

Inside

- DCA's dual-bus card gets mixed response from users, analysts. Page 65.
- 3Com offers one-stop control. Page 66.
- FCC approves mobile terminal network. Page 67.

LANs link departments, curry corporate favor

BY ELISABETH HORWITT
CW STAFF

NORWALK, Conn. — Interdepartmental local-area network installations enjoyed a major surge last year and will continue to grow during the next few years, according to Inteco Corp., a research firm based here.

Extrapolating from the latest results of an ongoing study involving 2,100 information systems managers, Inteco estimated that there are 250,000 IBM Personal Computer LANs in the U.S. today at multiunit enterprises — large corporations with multiple sites. Of these, 34,000 are interdepartmental LANs — networks connecting systems within different departments of an organization, Inteco said. Some 40% of those interdepartmental LANs have been installed within the last 12 to 14 months, according to Inteco Vice-President William Ablondi.

While Inteco is still working on a forecast for the interdepartmental LAN market, the firm predicted a significant rise in such installations during the next few years. This should in turn generate a "user pull" toward Unix as a way of providing common connectivity and database platforms across heterogeneous systems, Ablondi said. "Right now, users are looking for solutions to their computer problems and not shopping for Unix," he said.

However, the Unix world has already reached consensus on database and connectivity standards as compared with proprietary host vendors, which are still debating standards in these areas, Ablondi said. "Departments adopt their own solutions based on special needs; as corporations link up their departments, a system capable of operating in a multivendor environment will clearly be in demand," he said.

Unix systems will function not only as LAN servers but as

Continued on page 64

Who's getting together, and how?

A survey of 2,100 organizations suggests that research and design teams do the most work group computing, most often on LANs

Percent of departments		
Product design/ engineering	15%	8%
Laboratory/ research	12%	6%
Accounting	10%	2%
Production/ manufacturing	9%	2%
General office/ administration	7%	5%
Marketing	6%	Less than 1%

Joiner to connect VAX, AS/400 as peers

BY PATRICIA KEEFE
CW STAFF

MADISON, Wis. — Users who are seeking to attach IBM Application System/400s to Digital Equipment Corp.'s VAX family will get a helping hand from Joiner Associates, Inc. early this summer.

The BSC/400 link driver reportedly will introduce the first VAX-based, peer-to-peer connection to the AS/400 and IBM's System/36 and 38 networking software.

Joiner currently provides peer-to-peer links between VAXs and System/36 and 38 lines. BSC/400 will allow peer-to-peer bisynchronous file transfer and batch processing, said Steve Arnold, Joiner's director of research and development.

"Peer-to-peer means that not only can an IBM terminal send a batch job to what it thinks is a host — i.e., the VAX — but the VAX can do the reverse. Either system can print on the other's printer," he said.

One or the other

Arnold claimed competitors force users to go either through Transmission Control Protocol/Internet Protocol (TCP/IP) or use the master/slave remote job entry (RJE) approach. Multileading RJE, for example, allows the IBM midrange box to interact with a VAX host, but the VAX treats the IBM minicomputers as dumb RJE stations, he noted.

Planned support for the AS/400 reflects anticipated demand from Joiner's installed base. Analysts estimate that IBM has installed between 30,000 and 35,000 AS/400s.

Neither DEC nor IBM is likely to bridge to each other's strategic machines, providing suppliers such as Joiner with a potentially hot niche to exploit.

In a statement of direction for 1988-1989, Arnold said Joiner's goal is to provide network job entry (NJE) services over all widely installed network architectures. Further details surrounding plans to repackage and enhance Joiner's Jnet software line, Jnet Version 3.4, include the following:

- Peer NJE services and NJE applications management for each system on which Jnet is licensed.
- Bundled support for Open Systems Interconnect (OSI), said to provide NJE over OSI networks.
- Separate support for TCP/IP, IBM's 370 NJE products and Systems Network Architecture.
- A user interface to DEC Windows and support for desktop machines supporting X Window System Version 11.
- More flexible licensing to allow customers to pick and choose from among multiple networking options. Pricing for Jnet Version 3.4 will be based on DEC's Clusterwide pricing scheme.

Availability and pricing will be announced as specific products are formally introduced, Arnold said.

NEW DEALS

Northern Telecom wins airline contract

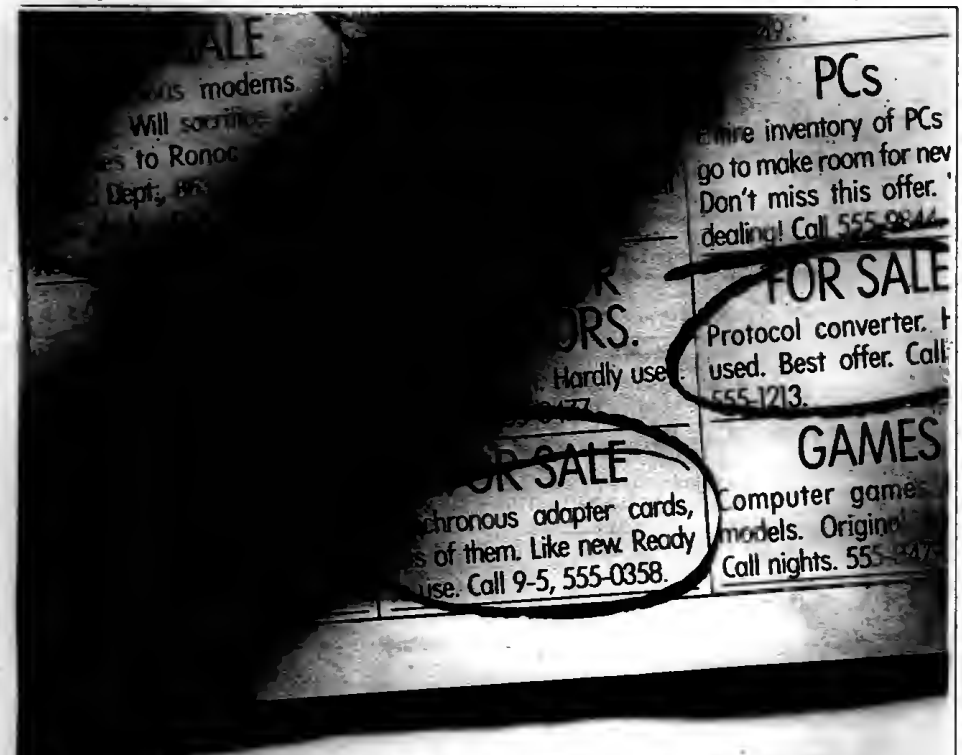
Northern Telecom, Inc. has landed a multimillion-dollar contract to provide a packet-switched backbone for **American Airlines'** internal office automation network, **Interact.** More than 50 Northern Telecom DPN-100 packet switches will interconnect approximately 135 Hewlett-Packard Co. HP 3000s, providing corporatewide electronic mail services as well as access to computing resources. The network is slated to go on-line in June.

Chase Manhattan Bank NA has signed a multimillion-dollar telecommunications services agreement with **MCI Communications Corp.** The agreement follows a 250% growth in Chase's use of MCI's voice services between 1987 and 1988, MCI said. Chase will implement MCI's E-mail service, MCI Mail, as well as voice and telex services.

Data General Corp. and **Softsolutions** have jointly won a contract to automate law offices at H. J. Heinz Co. Softsolutions will provide its legal software package, Corporate Class. DG will install four MV/2500 DCs and 50 Dasher/286 workstations, as well as local-area networks and PC*I software to connect offices in two Heinz subsidiaries: Star-Kist Seafood Co. and Weight Watchers International, Inc.

One **General Motors Corp.** subsidiary has awarded a major networking contract to the other. **Hughes Network Systems, Inc.,** a subsidiary of Hughes Aircraft Co., has won a contract to provide an X.25 integrated packet network to **Electronic Data Systems, Inc.**

The **State of Minnesota** has selected **Omnicom, Inc.** to study the best method for interconnecting the wide variety of E-mail systems used by various state agencies. The study, which began in March and will end in June, has the ultimate goal of making the state compatible with the Government Open System Interconnection Profile. Omnicom is a Vienna, Va., consulting company specializing in Open Systems Interconnect standards.



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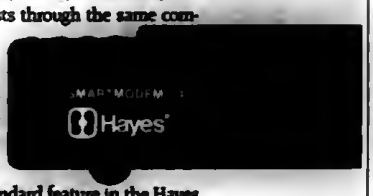

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*Using software which incorporates the Hayes Synchronous Driver (HSD) purchased from CQ Computer Communications, Digital Communications Associates, or Network Software Associates.
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Sniffer users gather today

MOUNTAIN VIEW, Calif. — Sniffcon-I, the first user group meeting for customers of Network General Corp.'s Sniffer network protocol analyzer, kicks off today through Wednesday at the Hotel Sofitel in Redwood City, Calif.

Issues critical to network performance, troubleshooting and growth will be the focus of the first conference, which was organized by the vendor.

Participants will choose from among 11 courses taught by Sniffer OEMs, including Sun Microsystems, Inc., Apple Computer, Inc., Texas Instruments, Inc. and Novell, Inc.

Consultant Dan Lynch, president of Advanced Computing Environments, will be the keynote speaker.

Sniffcon-I presents an opportunity for users to share their knowledge and learn new methods to optimize network capabilities, said Harry Saal, president of Network General.

LAN curries

CONTINUED FROM PAGE 63

electronic mail servers, database servers and network management systems for increasingly complex networks, Ablondi said. The power they bring to database management functions, however, is already being challenged by Intel Corp. 80386 PCs such as IBM's Personal System/2 and 80486-based PCs, be added.

Both LANs and departmental systems are popular in work areas such as legal, product design/engineering and laboratory research, the study found (see chart page 63). However, the study did not define to what extent a given work area would have both PC LANs and departmental systems.

Larger computer systems, which Inteco defined as computers costing $15,000 and higher, have yet to infiltrate LANs to any great extent, the study found. Twenty-eight percent of PC LANs now installed had such connections, and 80% of those host connections were local as opposed to remote, Ablondi said. Thirty-two percent of PC LANs linked laser printers, while 28% of LANs were used to link backup systems, Inteco said.

Compaq Computer Corp. systems made up the biggest percentage of PC-based dedicated file servers, with a 37% share, the study found.

Irma 3 receives a mixed reaction

BY PATRICIA KEEFE
CW STAFF

Users and analysts are giving Irma 3 Convertible, Digital Communications Associates, Inc.'s (DCA) recently introduced dual-bus 3270 emulation card, a thumbs-up for quality and convenience. But the jury is still out on whether the patent-pending technology will have any significant impact on the add-in board industry.

Irma 3 is a hardware-only adapter that supports both IBM's Personal Computer AT bus and Micro Channel Architecture [CW, April 24]. Early users confirmed DCA's claim of full IBM compatibility, touting the convenience and cost savings related to ordering one instead of two kinds of cards [CW, May 1].

"It simplifies your life," said Mark Bergman, an analyst at Volpe & Covington in San Francisco. But it is unclear whether anyone beyond Irma users, particularly those with stringent IBM compatibility needs, will reap that benefit.

Proof is in the pudding

A beta-test site at a California-based utility is a clear example of how IBM has eroded DCA's 3270 market share. This shop had standardized on Irma but was forced to go to IBM's 3270 board with the advent of OS/2 and the Communications Manager, according to a senior systems programmer.

The programmer's organization is migrating its users to Token-Ring. DOS-based personal computers use DCA's Irmalan for host access. Because OS/2 does not yet have Token-Ring gateway support, the programmer said he is forced to give IBM OS/2 users a coaxial or direct link for host attachment.

IBM does have a way around coaxial, but it is difficult to manage and consumes too much of the host resources, he said. Until a gateway is provided at mid-year, he said the Irma3 will serve as a good steppingstone.

Despite user plaudits, board makers do not appear eager to embrace the concept.

Quadram Corp. said that separate AT- and MCA-compatible boards are more practical. For $145 more than the cost of an Irma 3, users can buy two Quadram boards — one for the PC, one for an MCA machine.

"With a $695 Irma 3, the user pays for two boards and gets only one," the vendor claimed, implying that this contradicts DCA's attempt to offer users a cheaper MCA migration option rather than purchasing another board.

"But if I'm a card maker, and I have limited resources, why support two boards with dual engineering costs? It's more expensive to build one board that supports two buses, but that's still less expensive than building two cards," said Andrew Seybold, publisher of "Outlook on Computing."

He predicted that if DCA does not license the technology, other designs accomplishing the same end will surface.

It would be possible, with some difficulty, to build a card that supports Extended Industry Standard Architecture (EISA) and MCA, according to Seybold. "EISA is just an expansion of the AT bus. What's tricky is that MCA has one set of addressing schemes and EISA has another," he said.

Irma 3 gets a qualified note of support from International Data Corp. (IDC), a market research firm based in Framingham, Mass. "If it were anyone else other than DCA spending a lot of development dollars to redesign a *stand-alone* coaxial board, we at IDC would have our doubts," analyst Leslie Lord said.

She suggested the dual-bus card is great news for users who have standardized on IBM's hardware interface but want the flexibility of DCA's new hardware design.

"In the long run, if the board industry was to adopt DCA's dual-bus board design, users would not have to worry about being locked into a bus standard," Lord said.

Imagine working
26,000 hours
without a break.

One-stop 3Com, SNA control

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif. — By fall, users linking 3Com Corp. work groups to IBM Systems Network Architecture (SNA) networks may find themselves able to manage both systems from one workstation.

In the meantime, 3Com recently revved up its Network Control Server (NCS) family of servers, routing bridges and gateways with additional security, as well as remote and centralized access control capabilities. These are available now.

3Com and US West Network Systems, Inc. (NSI) in Bellevue, Wash., plan to jointly develop applications that, when coupled with NSI's Netcenter graphics network monitor, will consolidate management functions for both SNA and 3Com networks at one location. NSI is slated to deliver the software, which will be jointly marketed, in the fourth quarter.

For better integration

This alliance is the second in a series designed to bolster 3Com's efforts to better integrate its OS/2 LAN Manager-based 3+Open network with industry standards for enterprisewide and wide-area connectivity standards including SNA, Transmission Control Protocol/Internet Protocol (TCP/IP) and Open Systems Interconnect. In February, 3Com announced a technology partnership with Hewlett-Packard Co. that will provide it with TCP/IP support [CW, Feb 27].

The 3Com/NSI applications will transfer configuration, alert and command information from 3+Open and 3Com's Maxess SNA gateway or 3+Open Maxess to NSI's Netcenter graphics monitor for display under IBM's OS/2 Presentation Manager. This data is then consolidated with similar SNA information, providing a single point for network management.

The Maxess gateway supports IBM Advanced Program-to-Program Communications and provides 3270 emulation and network management services. 3+Open Maxess Version 1.0 is slated to ship this summer, followed by delivery of Version 2.0, which will support both DOS and OS/2 clients, by year's end.

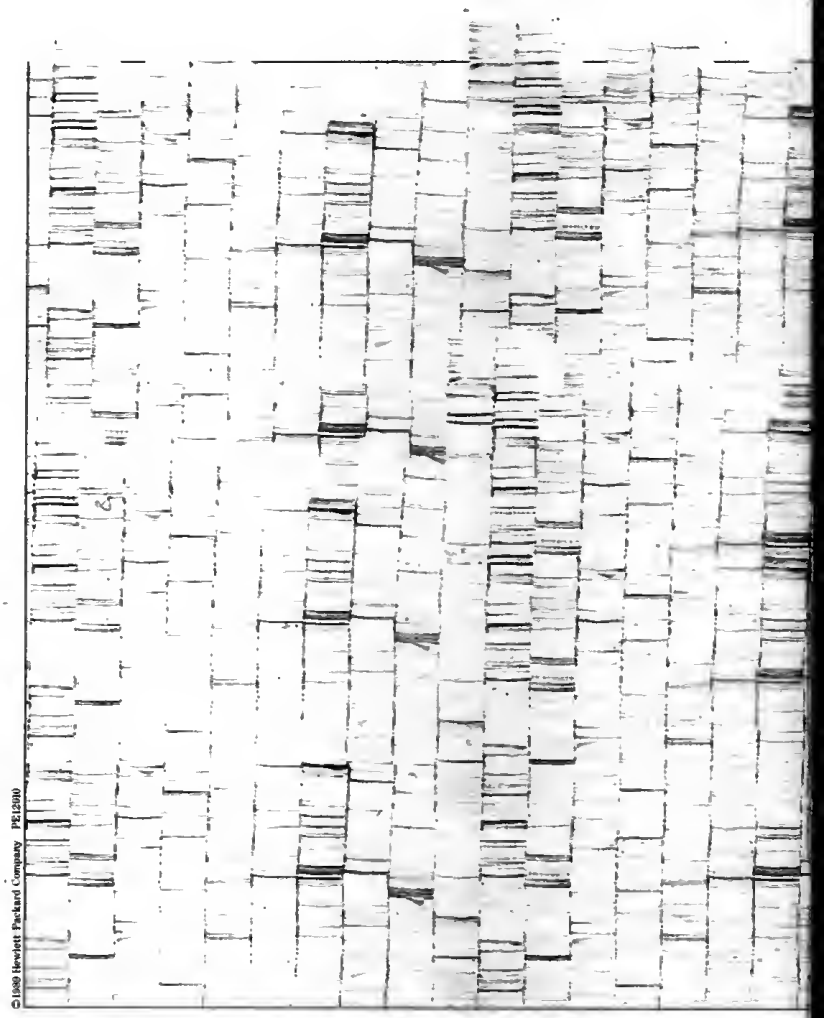
Netcenter consists of workstation software and an IBM MVS/VTAM mainframe application said to enhance IBM's Netview network management product. Operators can identify component and applications problems represented by color-coded icons and then issue problem isolation and diagnostic commands using pull-down menus and a mouse.

3Com has also moved to boost network management capability by adding the TCP/IP-oriented Access Control System of its Bridge Communications, Inc. NCS. The software enables network administrators to monitor and restrict access to network resources.

"We're now in a position to put host data on a public network [Telenet] and have controlled, shared access as opposed to dedicated lines," said Gerard Robinson, technology development manager at the School of Medicine at the University of North Carolina in Chapel Hill. He has 45 NCS servers supporting 400 terminals and 45 workstations.

Besides cutting network and telephone cabling costs, the enhancements remove security barriers to connecting hospital hosts with patient data to the school's 15-building Ethernet. Instead of maintaining dedicated lines to each terminal, Robinson is able to serve 300 users with just 30 connections. He will also take advantage of the security features to restrict access to dial-out services. "In the past, this was not possible," he said.

A new name service, system load features and internetwork routing bridge support are said to improve management of small or large 3Com networks. Robin-



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son was enthusiastic about the Domain Name Service, a standard under TCP/IP that supports multivendor environments. It allows the administrator to more easily distribute maintenance of the names database across multiple NCS or other name servers. It also shields users from technical network addresses.

The system load feature has also grabbed Robinson's attention. He is building a campus network, and this protocol reportedly provides software boot support for remote servers, while allowing simultaneous booting of multiple servers. In the event of a network shutdown, 3Com claimed the protocol can reduce the time it takes to restore a large network from hours to minutes.

Net approved for mobile terminals

Special radio frequency set aside for employees computing on the road

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C.— The Federal Communications Commission recently approved the construction of a nationwide data communications network that will use a special radio frequency to link mobile data terminals with host computers.

In essence, the network will make MIS systems accessible to "personnel who are not confined to the office environment," according to the proposal by American Mobile Data Communications, Inc. (AMDC), a subsidiary of RAM Broadcasting Corp. in New York.

Field service technicians, for example, could check inventories, order spare parts and inform headquarters of the status of a service call.

The proposed network will allow mobile employees such as traveling sales representatives to use vehicle-mounted or handheld data terminals to exchange data with company information systems. Possible applications include computer-aided dispatch, package delivery tracing, credit card validation and inventory management, AMDC said in its proposal.

Don't hold dinner

However, the service will not be available any time soon. The FCC granted a three-year construction permit to AMDC, which is expected to need every bit of the three years to build the sophisticated digital network.

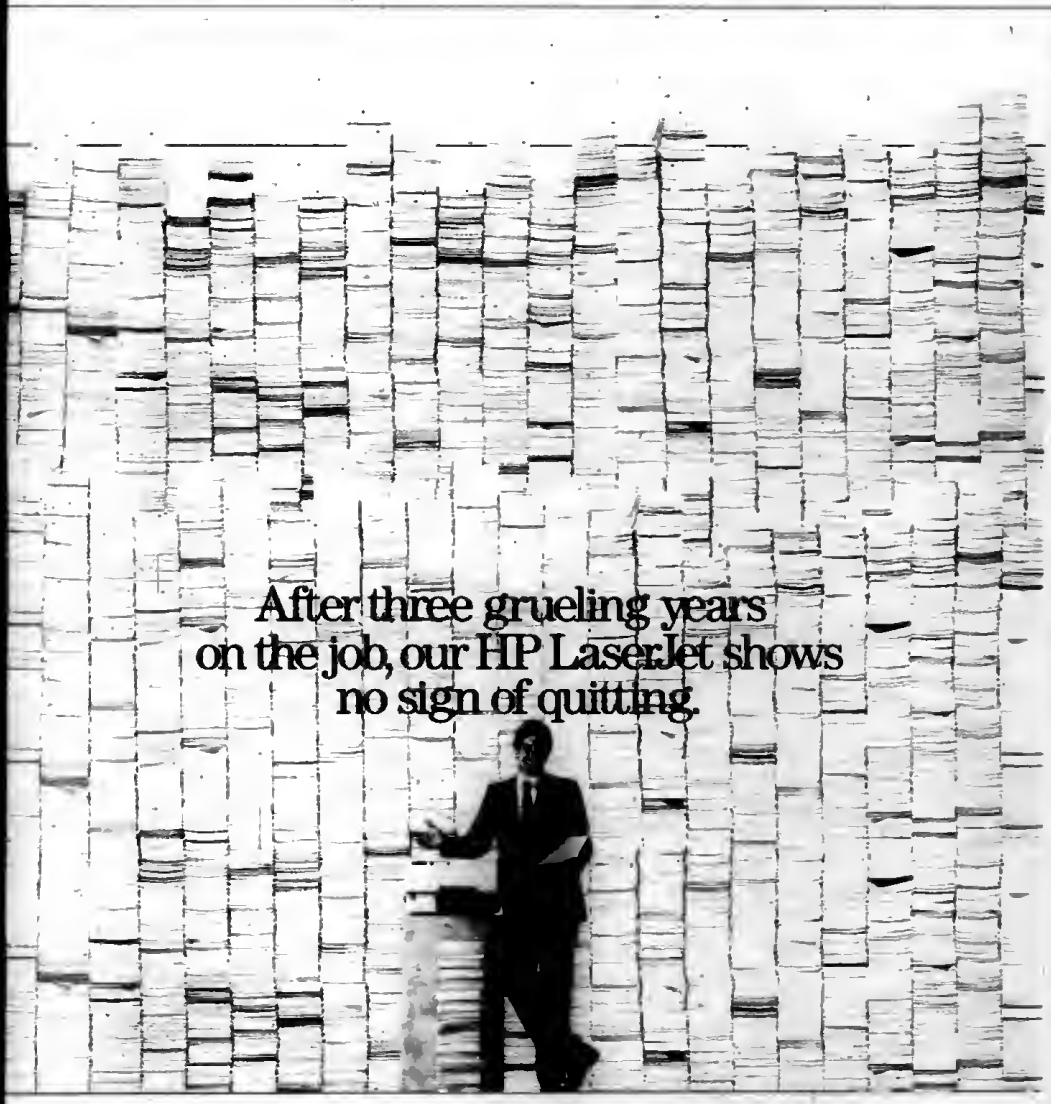
The AMDC network will use radio frequencies in the 900-MHz band, known as the Specialized Mobile Radio Service, and will be capable of transmitting data at speeds of 1,200 to 4.8K bit/sec., the company's proposal said.

AMDC said it will have network control centers in each of the 50 largest metropolitan areas. The centers will run the local radio networks, handle protocol conversions and provide interconnections to private lines and public packet-switched networks, which connect the radio network to the customer's host computers.

The network architecture will provide the clear channels needed for reliable data communications and boost the radio signal intensity so that it can penetrate buildings to reach portable data terminals, AMDC claimed. The network could serve about 10,000 users in each city.

User terminals could include laptop computers, handheld terminals typically used by inventory clerks and couriers, bar-code readers and data terminals that attach to mobile radios. The firm said it expects that applications software will be developed by itself, third-party developers and users.

The FCC said it relaxed several licensing regulations to encourage development of the innovative network — the first nationwide mobile data service available to a wide and diverse customer base. Similar networks have been built by IBM and the American Association of Railroads for those companies' private use.



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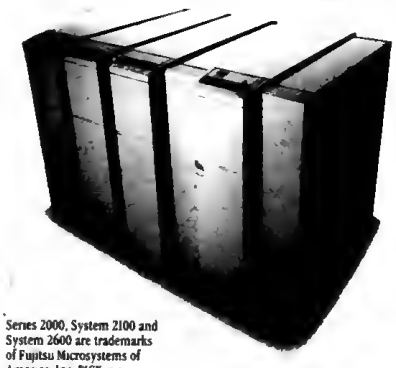

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FROM PAGE 63

Educational Telecomputing (WVNET), the host computing site for all educational institutions in the state.

The university is currently in a transition period, with ISDN being phased in and installed in a limited number of areas. Most users still dial into WVNET primarily over dedicated modem lines.

Because each user ties up an entire host port and the number of ports are limited, some users are left with no port available during peak traffic times. There are few things as frustrating as staring at a blank monitor while waiting for a data port to open up.

But the university plans to replace those dedicated modem links throughout the organization with B channels that support an X.25 packet-switched connection between users and hosts.

Currently, one full department has migrated to ISDN. In that department, multiple users physically transmit down the same pair of wires, but logically, each is assigned to an individual channel over the same link.

Each user is connected to the common B channel over an ISDN D channel, a 16K bit/sec. link that also supports packet switching. The user device makes a packet data call to a common ISDN number, which is actually the address of the X.25 B channel. The packet handler in the ISDN switch then assigns each user a logical channel. The ISDN switch's packet handler works with the X.25 handler in the host's data switch to establish each user's channel all the way to the desired destination. The channel is maintained as long as the data session is in effect.

While a B channel can technically support 127 logical user circuits, the real number is closer to 64 users, given the need for acceptable throughput.

There is also an additional benefit in that each user is accessing the host site at 9.6K bit/sec., instead of 1,200 or 2,400 bit/sec. as is common with modems. Thus, a single ISDN line replaces 64 individual analog lines at the host end. For WVNET, that works out to be a savings of nearly $1,900 per month for each ISDN B channel in service in line costs alone.

The host's data switch can now handle 63 more users per port, thus making the host more accessible to a significantly larger number of people.

Imagine the potential of this application for point-of-sale or credit verification terminals, both of which require short interactive sessions. Such devices are often arranged in cluster groups such as sales terminals, which might be located in the same department store.

It might be argued that the same X.25 solution is possible without ISDN — over a dedicated 56K bit/sec. digital line, for example. However, West Virginia University found that in its location, a digital line costs $480 per month instead of the $47 ISDN line charge. Furthermore, digital lines often incur mileage charges, which is rarely the case with ISDN lines.

Actually, these cost savings can be nearly doubled. An ISDN Basic Rate Interface provides two X.25 B channels, whereas most non-ISDN solutions provide only a single X.25 link.

All that is needed to exploit the extra bandwidth is to add an additional packet assembler/disassembler at each end of the link.

ISDN is sometimes criticized for being expensive to implement — and with some justification. In time, customer-premise equipment prices will drop as more competition enters the marketplace and vendors recover their initial research and development costs. Until then, the key to ISDN network implementation is in identifying applications that enhance network services and save corporate dollars at the same time. For West Virginia University, the X.25-based host link is just such an application.

Fritz is a data communications analyst at West Virginia University in Morgantown.

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NEW PRODUCTS

Local-area networking software

A software package designed to allow local-area network users to monitor and control any computer on the network is now available from Artisoft, Inc.

According to the vendor, The Network Eye permits users to broadcast their computer screens to other computers on the network and interact with multiple users for educational and training purposes. Users can reportedly view and control up to 32 computers linked via any IBM Netbios-compatible network. The Network Eye is priced at $295 per network of up to 120 computers.

Artisoft
Suite 330
3550 N. 1st Ave.
Tucson, Ariz. 85719
602-293-6363

Action Technologies, Inc. has announced two software programs for The Coordinator, the company's work management and communications software application for personal computer networks.

Group Calendars for The Coordinator integrates calendar capabilities with electronic mail functions in a wide-area network, the company said. With delivery scheduled for this month, pricing will range from $245 for a stand-alone system to $995 for a 30-user configuration.

The other program, called Macaccess, is reported to be an electronic messaging program designed specifically for Apple Computer, Inc. Macintosh computers. The product is scheduled for delivery at the end of June and will be priced at $345 for a five-user version.

Action Technologies
11th Floor
2200 Powell St.
Emeryville, Calif. 94608
415-654-4444

Online Computer Systems, Inc. has released an enhanced version of its Opti-Net compact disk/read-only memory (CD-ROM) networking software package that will reportedly connect as many as 100 users and nine independent optical servers on an existing local-area network.

Opti-Net 1.10 allows multiple users to have simultaneous access to one or more CD-ROM databases, the vendor said.

An eight-user license retails for $795, and a nine- to 100-user license is priced at $1,495, according to the vendor.

Online Computer Systems
20251 Century Blvd.
Germantown, Md. 20874
800-922-9204

Digital Products, Inc. has announced an enhanced version of its Popup printer control software package.

The product reportedly includes a forms overlay capability that enables users to select and print an image, logo or letterhead at the same time as the document itself. According to the vendor, the command to print the image can be stored in memory in the company's Netcommander Sublan or Printdirector printer-sharing device so that the overlay command will automatically be sent to the printer at the start of the next print job.

The Popup software with forms capabilities comes standard with all Digital Products printer sharing devices.

Digital Products
108 Water St.
Watertown, Mass. 02172
800-243-2333

PC Manager, Inc. has released a network version of the company's PC Album image database software package.

The program incorporates a programmers' application language and can capture images via a video camera, videocassette recorder, laser disk and other devices for output to various printers, the vendor said.

The package is priced at $2,495.

PC Manager
Suite 430
8330 Boone Blvd.
Vienna, Va. 22180
800-654-5845

Network services

Digital Equipment Corp. has enhanced its portfolio of network services products.

The Local-Area Interconnect Service now includes improved support capabilities for customers' local configurations of cable plant and interconnect hardware, the vendor said.

An on-line database reportedly provides customers with real-time access to their network inventory and offers round-the-clock status of network elements and support for critical fault isolation.

The service is priced at $300 per month.

The Wide-Area Interconnect Service is reportedly focused on remote fault isolation, resolution and verification. According to the company, an alarm function that monitors circuit characteristics has been added, as well as a "hot spare" option that permits remote switching of a customer's spare modem at a central location.

The monthly charge, including test equipment and installation, is $289 per link, the company said.

DEC
129 Parker St.
Maynard, Mass. 01754
508-493-4297

A software product that provides a low-cost time service for Digital Equipment Corp. Decnet environments has been announced by Precision Standard Time, Inc.

The Netset 6000 software package connects the company's Time Source radio time receiver to a DEC Local-Area Transport network terminal server to provide automated time-reference costing, the vendor said. The software package is compatible with DEC's VMS Versions 4.1 and higher. Network licenses can be purchased in 10-unit increments on a sitewide basis.

Including the Time Source, a VAX 10-unit network can be synchronized with Netset 6000 for $3,395. A VAX 50-unit version costs $8,895.

Precision Standard Time
105 Fourier Ave.
Fremont, Calif. 94539
415-656-4447

Modems/ Multiplexers

Data Race, Inc. has introduced an integrated V.32 modem designed for the company's Mach statistical multiplexers.

The Mach V.32 modem option connects at 9.6K bit/sec. over dial-up or leased lines and provides automatic dial backup and automatic restore facilities, the vendor said. It is priced at $1,495. The Data Race Mach 4 and Mach 8 multiplexers are priced at $895 and $1,295, respectively.

Data Race
Suite 108
12758 Cimarron Path
San Antonio, Texas 78249
512-692-3909

A 2,400 bit/sec. internal modem designed for the IBM Personal System/2 Models 50, 60, 70 and 80 is now available from Prometheus Products, Inc.

The Promodem 2400PS is reported to be completely compatible with IBM's Micro Channel Architecture bus and will operate at 2,400, 1,200 or 300 bit/sec.

The product is shipped along with a proprietary communications software package and is priced at $299.

Prometheus Products
725 S.W. Bonita Road
Tigard, Ore. 97223
503-624-0571

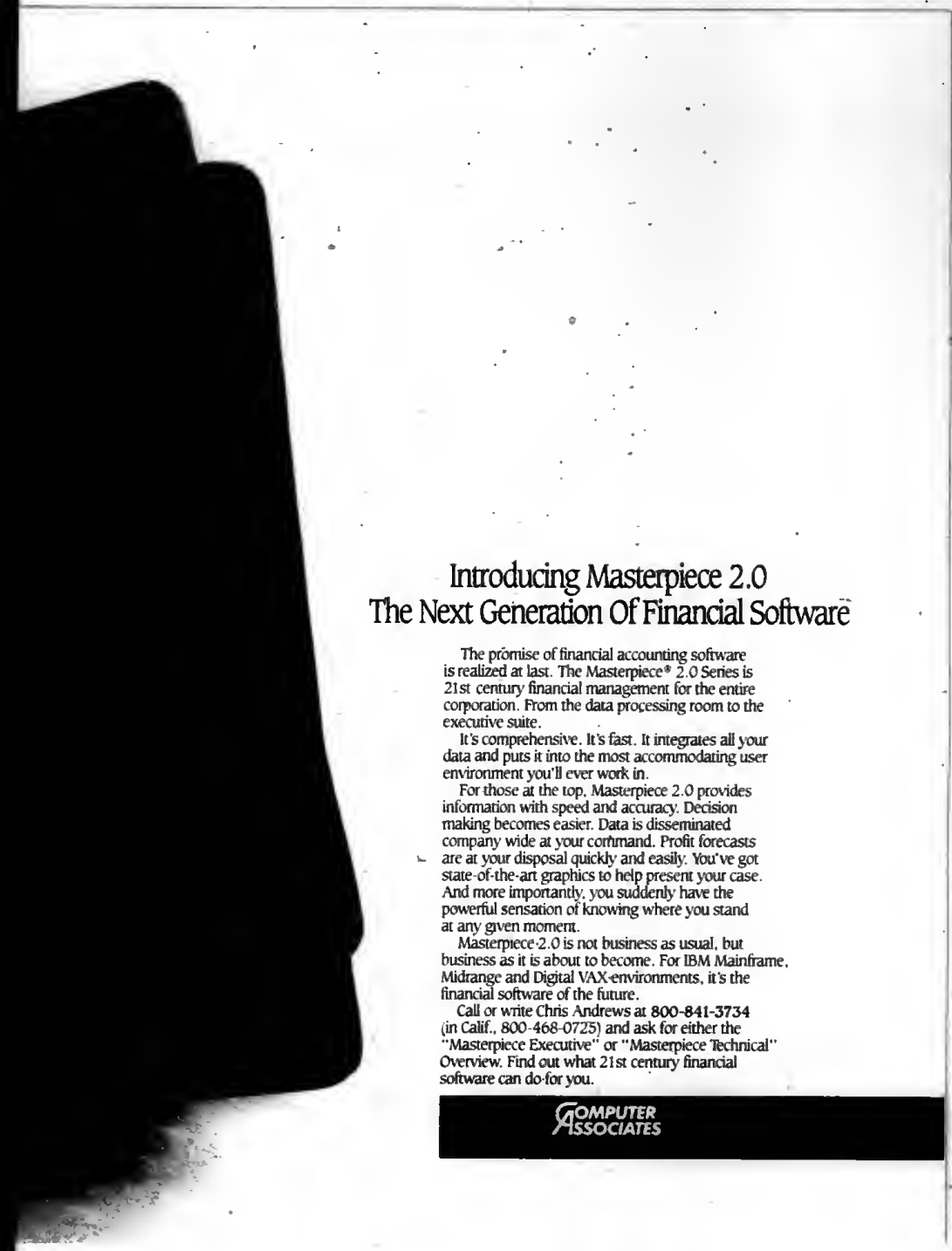
Astrocom Corp. has enhanced the E299 Squeeziplexer, its low-cost alternative to IBM 3299 multiplexers.

The product has reportedly been reconfigured to accommodate all three types of IBM 3270 interfaces.

The unit was initially designed to save network managers time, space and cable costs by enabling one RG62A/U cable to replace as many as eight individual cables without speed degradation, the company said.

Pricing ranges from $575 to $625, depending on model ordered.

Astrocom
120 W. Plato Blvd.
St. Paul, Minn. 55107
612-227-8651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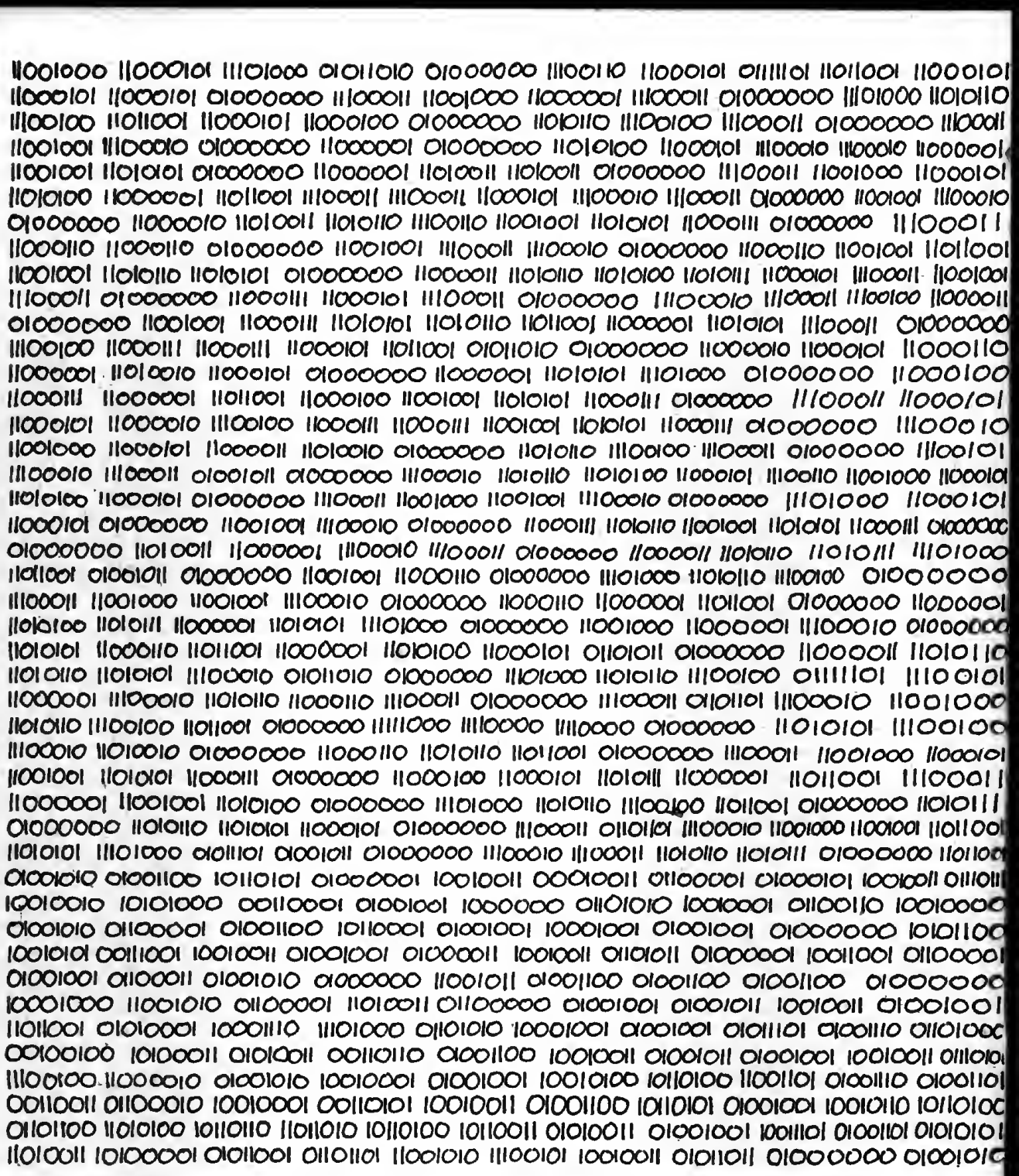
COMPUTER ASSOCIATES



Just because you found it doesn't neces

Every programmer who's ever spent half a night tracking down a bug knows that finding it is one problem, finding out how it got into your code in the first place is quite another.

Until now, the best tool you could get to help was a rather primitive debugger that did little beyond finding and patching. If you wanted to make sure the same bugs didn't show up again, you were on your own—with an emphasis on intuition and endurance.

The missing ingredient in all of this hitting-and-missing, of course, has always been intelligence. About the program itself. About the testing that's been done to date. About reams of code that, chances are, someone else wrote years ago.

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SmartTest not only hunts down bugs for you, it lets you do it while your job is up and running in its native environment. That means no setup. And, no need to duplicate changes made in the test session with those required in production.

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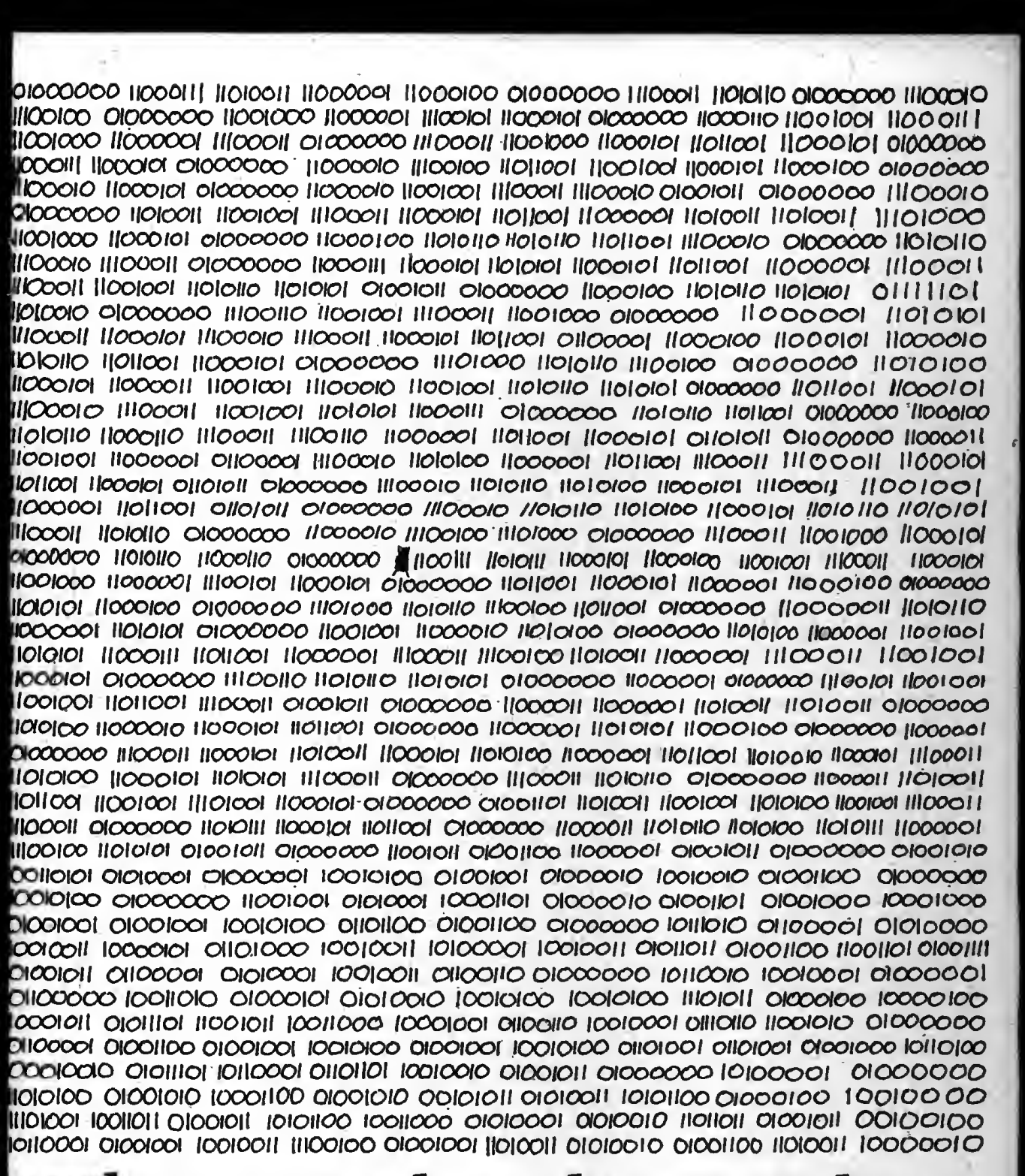

sarily mean you know how it got there.

SmartTest knows where each and every program logic and data modification path is located. The complexities that hide problems are quickly unraveled when you ask SmartTest why the problem occurred. The net result: SmartTest identifies how the bug got there in the first place. Automatically.

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With KnowledgeWare tools, you're free to build applications almost any way you like. Ideally, you might start with the planning tool, move to the analysis and design tools, and then produce a working application with IEW/GAMMA.

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MANAGER'S JOURNAL

EXECUTIVE TRACK

Arnold Van Zanten has been appointed vice-president of systems at Houston-based **National Convenience Stores, Inc.**, operator of 1,075 specialty retail stores in five states.

Van Zanten was previously vice-president of operations support at Coastal Mart. He joined Coastal in 1985 when it acquired ANR Corp., where Van Zanten was vice-president of information services. He joined ANR in 1977 and held several information management positions, having begun his career as a consultant at Arthur Andersen & Co.

Van Zanten holds an undergraduate degree in electrical engineering and a master's degree in business administration, both from the University of Michigan.

.....

Neal Lassila has been named director of MIS at **Empire of America Relocation Services, Inc.**, an Orlando, Fla.-based relocation management firm and subsidiary of Empire of America Federal Savings Bank.

He is responsible for Empire's entire IS area, including a network of IBM Personal Computers and a 3083 mainframe. He will also assist Empire clients in enhancing their computer technology.

Lassila has been with Empire for three years in various positions in the MIS department, including acting manager of MIS and technical services manager. He holds a bachelor's degree in business administration from the University of Pittsburgh. He resides in Orlando.

.....

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

IS takes to the streets

Rubin joins war against crime with law enforcement system

BY ELISABETH HORWITT
CW STAFF

Aside from a metal detector downstairs, Leonard Rubin has no buffers between himself and the law enforcement system he supports with his computers — which is just the way he wants it.

As director of MIS for the New York County district attorney's office, Rubin works in an aging concrete monolith located just west of New York's Chinatown. To get to his office, visitors pass the metal detector, climb a dingy flight of stairs and walk through corridors reminiscent of an inner-city public high school.

Adjacent to Rubin's office are several rooms full of people in their early 20s, dressed in loose, casual clothing that blends well on the streets — but definitely not the corporate offices — of lower Manhattan. Some are terminal operators, some secretaries and some cops waiting to be interviewed by the assistant district attorneys.

Don't look for designer sofas, fancy desks, dark-wood display cases and other executive trappings in Rubin's office — they are up on the eighth floor with the district attorney and the executive staff.

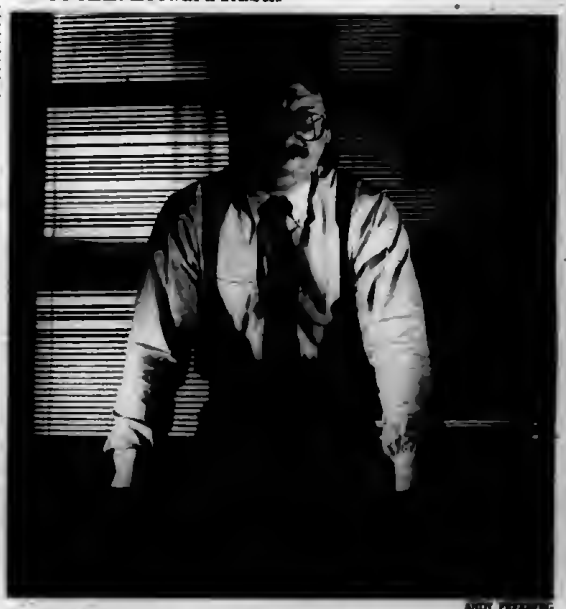
Not that Rubin lacks managerial style. At 42 years old and neatly dressed in a jacket and tie, he clearly enjoys his job and is perhaps easier to talk to than some executives in power suits. However, there is no question as to who is in charge here.

"This is a fascinating place," Rubin says. "So much happens in this office — interesting cases — that you're drawn in. The goal here is not just putting people in jail but giving them the benefit of the doubt."

Rubin followed an unusual path to the public sector — stints in academia and business. Seven years ago he was a professor of sociology at a New Jersey college. He then landed a job as a programmer at a manufacturing company

Continued on page 82

PROFILE: Leonard Rubin



ANDY FREEBERG

Position: *MIS director, New York County district attorney's office*
Mission: *'To have an impact' in the city's battle against crime*

Study: Banks emerge from IS hiring lag

BY ALAN J. RYAN
CW STAFF

The good news is that systems executives in the financial services industry are a much sought-after breed in 1989.

The bad news is that in other industries, including manufacturing, publishing, transportation and utilities, there is little demand for top information systems talent.

That is according to a recent study by John J. Davis of John J. Davis & Associates, a New York executive search consultant specializing in information technology.

Davis predicts demand for IS executives in the financial services industry — which up until recently experienced slow hiring rates — will remain strong throughout this year.

ROBIN JARRAUX

In industries that are currently hiring, Davis said that demand for IS executives currently far exceeds the supply of top talent. As a consequence, he said, senior-level salaries are up as much as 25% over a year ago.

"Recruitment in information services virtually ground to a halt" after the stock market plummeted in the fall of 1967, Davis said. "But since the beginning of the year, that 12 months of pent-up demand has burst through."

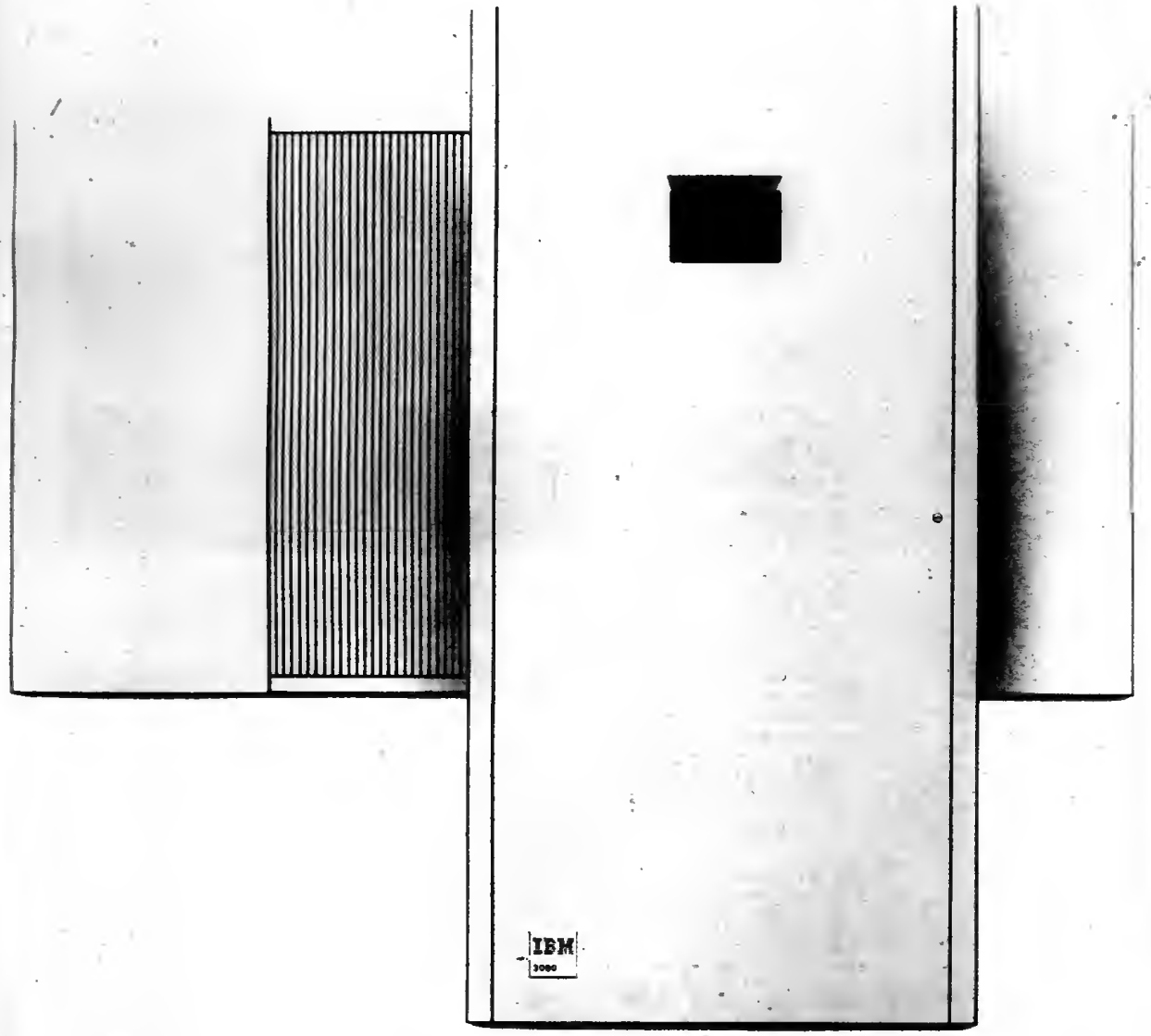
He added that there is a continuous need for financial services IS professionals because that industry is data-sensitive.

Davis said that the major banks are coming out of a slow period in hiring. Out of necessity, they are responding to mounting foreign competition, especially from the Japanese, by beefing up their senior IS staffs, he added. Lest executives suspect they can shift from one industry to another that offers more promising hiring trends, though, Davis said that a strong IS background is not enough to get someone hired.

"For the most senior IS jobs, companies are looking for corporate visionaries who are on top of emerging technologies and who can tie information systems to the bottom line," Davis said. Essentially, these workers are able to combine their IS and managerial skills.

Other areas that have shown increases in IS executive hiring are retailing, communications and such service industries as advertising, health care and the legal profession, Davis said.

The host.



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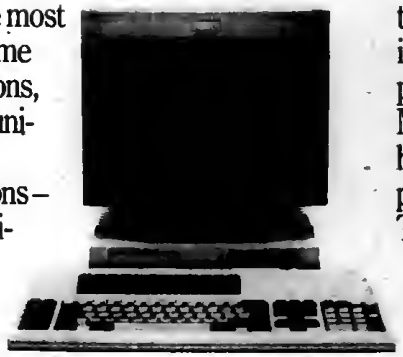

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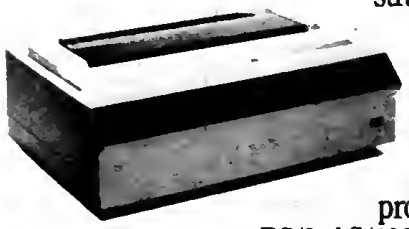

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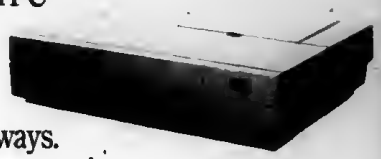

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Federal managers at a personnel loss

BY MITCH BETTS
CW STAFF

RICHMOND, Va. — Federal managers must come up with clever ways to work around the government's low pay schedules and outdated personnel policies if they are going to hire and retain qualified information systems employees, according to speakers at a recent U.S. General Services Administration (GSA) conference.

"This is a very, very difficult environment, but I think we can make some progress," said Wallace O. Keene, head of information resources management at the National Aeronautics and Space Administration.

According to a report by the U.S. General Accounting Office, the government faces a shortage of entry-level computer specialists because of low pay, outdated job descriptions, limited training and the federal government's generally bad image.

The salary for an entry-level programmer in the federal government, $15,118, is as much as 33% lower than the salary for the same job in the private sector, the report said.

Francis A. McDonough, GSA's deputy commissioner, said there are two types of agency managers: those who think the situation is hopeless and those who are "working the system to make it work."

The purpose of the GSA Information Systems Work Force Conference was to bring those two groups together to share ideas and strategies for recruiting employees, McDonough said. The conference included sessions on how to run advertising campaigns, interview college students and start internship programs.

One recruitment strategy was described by Orion Birdsall, a human resources manager at the Internal Revenue Service. Faced with a shortage of data entry clerks at its service center in Andover, Mass., the IRS started handing out awards to clerks who recruited a new employee — a move that produced a surplus of applicants, Birdsall said.

MANUELLO PAGANELLI

GSA's McDonough *trying to find a solution*

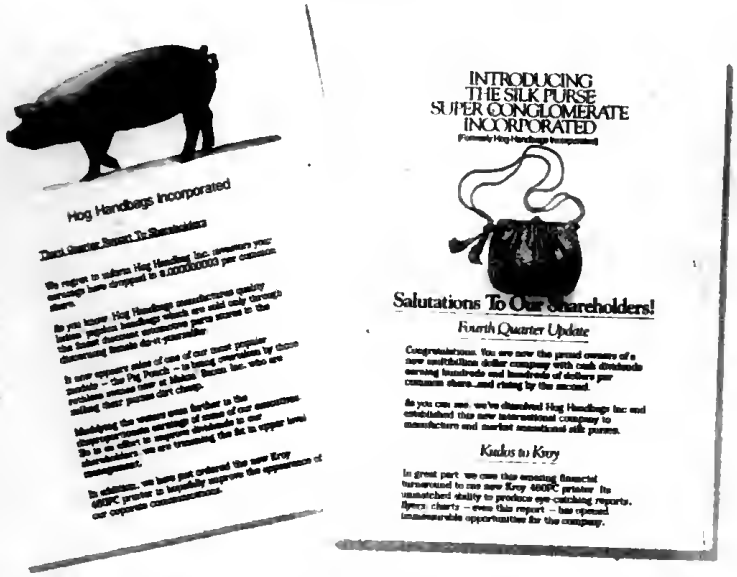
Several speakers said that IS managers need to integrate their long-range plans with their agency's personnel plan or at least do a better job of telling the personnel office what employee skills are needed.

"You have to know what kind of people you really need," Birdsall said, "just like the Washington Redskins knew that they needed some big running backs" in the college football draft.

John J. Landers, another GSA official, said there is no governmentwide solution to the recruitment problem because each agency has different needs. For example, he said that managers at the U.S. Department of Agriculture's computer center in Fort Collins, Colo., have no recruitment problems because the area has a steady supply of college graduates and because few private corporations pay higher salaries. But other data centers face big problems because of noncompetitive pay rates.

Meanwhile, the Office of Personnel Management is studying "locality pay" — that is, higher salaries in such costly metropolitan areas as New York and Los Angeles. In addition, special pay rates — up to 30% higher than the regular pay schedule — can be approved for computer specialists if the agency submits a study justifying the higher pay and certifies that it has the necessary budget, according to Clarence Mathews, chief of the personnel management office's special rates branch.

How To Make A Silk Purse Out Of A Sow's Ear.



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This amazing—yet surprisingly affordable—device is designed to dramatically enhance the documents you're now producing with just your dot matrix or daisy wheel printer.

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The Kroy 460PC prints out letters and symbols that are actually superior in quality to most laser printers. On your choice of clear, opaque, or a wide variety of colored tape. And the peel-off adhesive-backed tape makes the lettering easy to apply.

Getting started on the system is as simple as plugging the Kroy 460PC printer into your MS-DOS compatible computer and accessing the supplied LetterCrafter software.

Then you're ready to print—even from the data you have stored on your disks right now.

Just think of this amazing system as *desktop publishing on an adhesive strip.* Which instead of making your present printer obsolete, complements it with a variety of sharp, crisp, professional lettering in seconds.

Find out for yourself just how affordable and effective the Kroy 460PC printer can be for your office. Fill out and mail the coupon to us for a free hands-on demonstration.

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In fact, it's fair to say that no other application development software does more to *maximize the potential of hardware vendor databases than PowerHouse.*

COGNOS

TAKING CHARGE

Clinton Wilder

Gaining control by dispersing it

"You have to give it away in order to keep it."

The line was spoken by Peter Mather, vice-president of MIS at Air Products & Chemicals, at last month's Society for Information Management conference. The "it" is control of the information systems function, which Air Products, after a long planning process, has just dispersed from Mather's central bailiwick to its business units. Mather's top lieutenants now head IS in each business unit and report to the head of that unit instead of to Mather.

This type of decentralized organizational chart is old hat in many companies, but it is not dotted lines vs. solid lines that determine IS success. Rather, it is how well IS strategy and architecture is integrated with business strategy. To make it work, the businessman, not the systems department, must take responsibility for IS.

For the IS chief, that means giving something up. It may mean fewer direct reports, less budgetary control, less end-user support and certainly less applications development responsibility. But less, as the old saw goes, is more.

"It's a very scary business," says United Technologies Vice-President of Information Management John Hammitt, "but dispersing power really works." Mather compares the pain of the process to that of parents when their children enter adolescence. "If you don't give your kids some freedom, you'll lose them," he said.

Learning to let go is not easy, and its difficulty may be multiplied by the number of years that the IS chief has been employed at his company. But veteran IS types may be the ones confident enough of their role in the corporation to be able to open the gates of the systems fiefdom and send their legions out to other reaches of the corporate kingdom.

Clearly, the strength of the IS/business partnership creates the proper environment to encourage giving up control. If the IS executive feels like part of the top management team and is confident that the business unit heads are sufficiently versed in the business potential of information technology, he is going to be a lot more comfortable giving up some control. He will understand that less direct responsibility for IS does not equate to less importance in the organization.

Chicken or egg

The tricky part, however, is that it is a chicken-or-egg situation. It is the very process of transferring responsibility from central IS to the business unit managers that strengthens the IS/business partnership.

Of course, there are a number of areas in which, in most organizations, IS should fight hard to retain control. Corporate communications and operating systems standards head the list, which might also include network management, volume purchasing and/or leasing and research on emerging technologies.

The central IS department can and should be "Infrastructure Central." But the business units must be the place where the business applications — the strategic components — reside.

"Hold on just a minute," responds Straw Mann, an imaginary IS chief. "I've spent the last three years here convincing our CEO that computer technology is critical to our business and finally selling our chief financial officer on the notion that IS must be viewed as an investment, not just a cost. I've finally won those battles, and I'm in charge of the whole effort. *Now* you want me to send my best managers and developers out to the Widget division and the Wicket subsidiary?"

Exactly, Mr. Mann. Let's borrow for a moment your favorite argument with the CFO — the cost of *not* doing it. Your company has seen the light of IS competitive potential. Now you're going to have all those widget and wicket guys coming up with ways to use IS in marketing, product development, customer service, distribution and all the rest.

> LEARNING TO let go is not easy, and its difficulty may be multiplied by the number of years the IS chief has been employed at his company.

You think they want to line up behind your applications backlog to get those systems developed? Their competitors will blow them out of the water. So they're going to do it themselves, using who-knows-what hardware platforms, software and networking protocols. Then you'll really have lost control. (This is all too true in many companies.)

So why not put your best people out in those divisions to coordinate that effort with the business unit heads? Then it's a true partnership, instead of the renegade users designing systems because IS couldn't deal with the bottleneck.

As always, it comes down to people and relationships, not organizational charts. "My success," Hammitt says, "is what I can get other people to do." If the IS chief is savvy enough and confident enough to know when to let go, the spirit of partnership has a much better chance to flourish.

Wilder is Computerworld's senior editor, management.

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April 27	Somerset, NJ	May 23	Chicago, IL	June 13	Houston, TX
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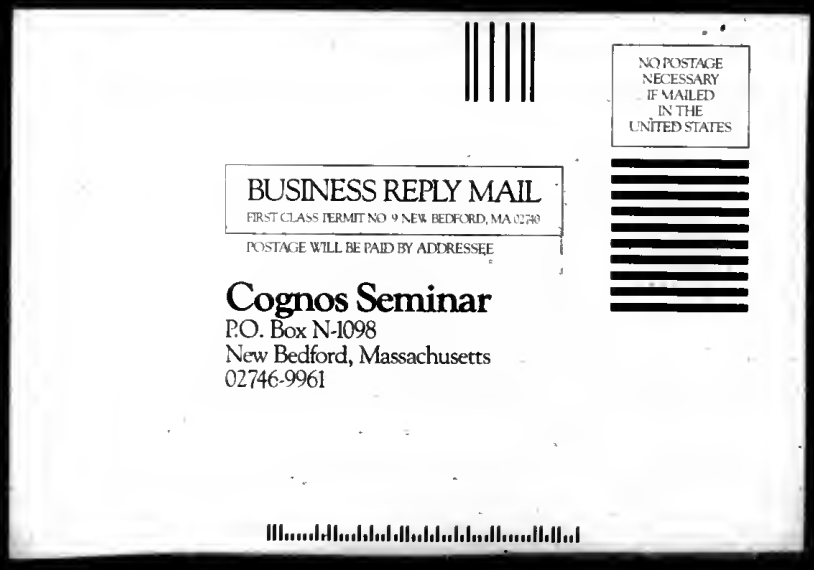

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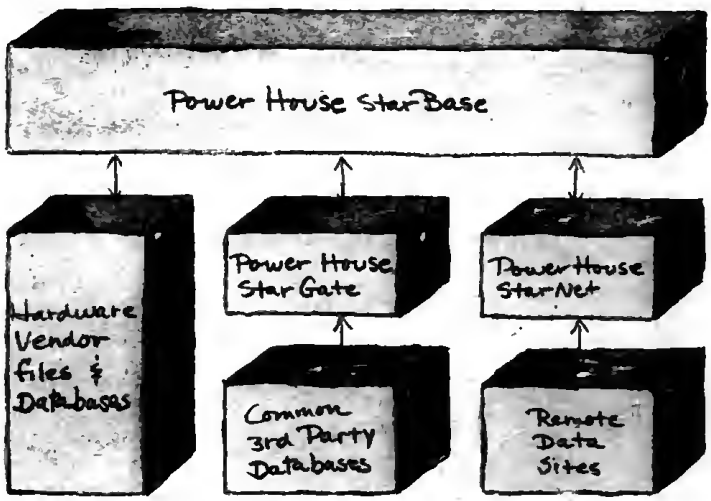

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Rubin

CONTINUED FROM PAGE 75

and later became a systems analyst at American Express Co. His sociology background helped him design systems to meet business needs. Eventually, he was promoted to project manager.

But something was missing. "My roots were not in the business world," he says. Rubin says he likes his current job because he can have an impact on the city's worst crime problems, such as drugs.

Richard Girgenti, the administrative assistant district attorney, hired Rubin four years ago. "I was impressed with the genuineness of Len's interest in this office," Girgenti recalls. "Some people might see this job as a steppingstone back to the private sector, but he had public spirit."

Girgenti says Rubin was adept at handling the relationship between MIS and some of the toughest end users anywhere — lawyers. They can be "argumentative and have a lot of ego," he says. "Len gets along with people. When you're a new kid on the block, you run a risk if you come in with all the answers. Len's predecessors had that problem. You have to win people's respect first, especially in a legal office, and he did."

"I think I was a lawyer in a previous life," Rubin jokes.

Rubin's ability to focus systems development to specific user needs played a major role here. Under his leadership, MIS implemented technology and applications with immediate paybacks to crucial areas of the district attorney's office.

For example, Rubin initiated the development of an investigation case management and analysis system that compiles information from surveillance and wiretapping. As a result, assistants can now perform database cross-checks on suspects using license plate numbers, nicknames and more.

Rubin also contracted with Nynex Information Solutions Group, Inc. to implement a videoconferencing system that allows assistant district attorneys to interview policemen about arrested suspects over a remote telecommunications link. This means that the officers can stay at the local precinct station instead of having to travel to the district attorney's office and do it in person. Affidavits are then drawn up and faxed to the station so the officer can sign them. The system cuts the time it takes to process a complaint and gets the cop back on the street in about one to two hours, Rubin says.

Put down the pens

Attorneys no longer have to handwrite lengthy streams of legalese in response to a series of motions, because Rubin got his people to develop software that automatically fills in the legal language when the entry clerk types in a certain code. All the attorneys have to do is check the box beside the right code numbers. The system presents a series of fields and prompts the clerk for key facts. For example, in an arrest for crack possession, the system asks for the number of vials.

"The benefits of computerizing prosecution as much as possible is that it frees up legal people to do much more lawyering," Rubin says.

Rubin's department makes use of two IBM 3090 mainframes at the Computer Service Center, a facility shared by a number of New York agencies. His 100-person staff currently supports approximately 300 IBM Personal Computers — about 70 of them on a local-area network supplied by Banyan Systems, Inc. The office plans to install minicomputers from an as-yet unchosen vendor within the next six months.

Rubin clearly takes pride in directing the role of information systems in the never-ending war on crime. One of his happiest memories on the job was the day that the deputy mayor of Moscow stopped by the district attorney's office during a visit to New York. "He pointed at me and said, 'This is the most important job here,' " Rubin says.

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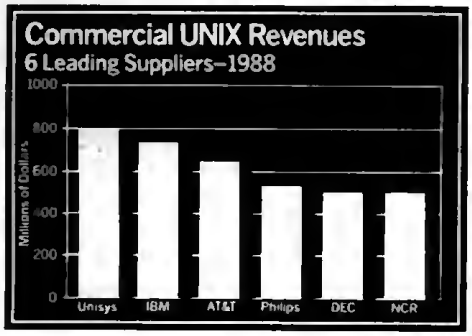

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MANAGEMENT BRIEFS

Prickitt assumes top post at ASM

James W. Prickitt, supervisor of the litigation systems group at **Chevron Corp.** in San Francisco, has been elected president of the Association for Systems Management (ASM) for 1989 to 1990. Prickitt will take office June 1.

President-elect for the following term is Scott J. Beltz, a manager at Extended Systems, Inc., based in Boise, Idaho. Cleveland-based ASM represents 8,000 systems professionals in the U.S. and overseas.

The National Computer Graphics Association is accepting papers and presentations for **NCGA Mapping & Geographic Information Systems '89.** The show is scheduled for Nov. 12-15 in Los Angeles.

The show will focus on energy mapping, environmental mapping, defense mapping, public utility mapping, urban and regional mapping and introduction to automated mapping and geographic information systems. Those interested in proposing technical presentations should submit a 500-word abstract to NCGA no later than May 26.

For more information, contact NCGA's education coordinator at Suite 200, 2722 Merrilee Drive, Fairfax, Va. 22031.

When it comes to their information systems, there is one thing all CEO's can agree upon:

"There has to be a

Your CEO has said it. And you've said it yourself. There has to be a better way.

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"$10,000,000 invested in systems and software and I still can't find out what I need to know when I need to know it."

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"We either have to get all our computers talking to each other...or pray for a 9-day week."

We achieve that goal through an unswerving dedication to an open networking strategy we call HP AdvanceNet. It's a strategy that operates in strict conformance with industry standards such as OSI. As well as with de facto standards like TCP/IP and SNA.

It's a strategy that we back with over 300 products for both local office and company-wide networking. Products which have been installed in over eighty of the top one hundred *Fortune* 500 companies.

Finally, it's a strategy that stands in stark contrast to the proprietary approach often taken by other vendors.

Hewlett-Packard's AdvanceNet offers true multivendor connectivity. It already conforms to standards which offer your company far greater potential for communication and growth into the future. And it includes a service and support program designed expressly for your multivendor environment.

HP lets you fully exploit all the information in your system.

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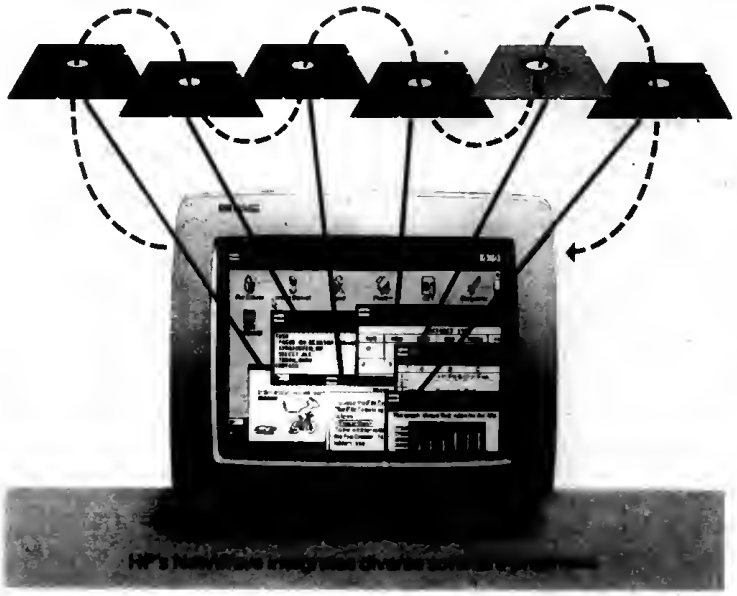
There is a better

It's HP's NewWave environment. With it, the usefulness of applications can be greatly expanded. Users can, for example, create documents that incorporate text, graphics, and spreadsheets. Send those documents anywhere in the system. And do all this using their favorite software.

But NewWave goes even further. It allows for an interaction between text, numerical, and graphical data such that a change in one is immediately reflected in the others. And it automates standard procedures across applications, greatly reducing the amount of time spent performing repetitive tasks.



HP's NewWave environment adheres to standards* and enjoys widespread industry support. It increases user

*HP's NewWave software technology is based upon and extends the capabilities of well-accepted PC and workstation environments. Microsoft® Windows, Presentation Manager, or OSF/Motif.

way.

productivity and decreases time-to-decision. In short, it makes using your computer system far more intuitive and therefore much easier.

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We at Hewlett Packard have structured our entire company around a very simple idea: giving our customers everything they need to compete more effectively.

Today, under that mandate and backed by the widest range of systems, peripherals, PC's, and instruments in the industry, we are delivering the "better way" demanded by American business.

John Young
President & CEO
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CALENDAR

Ouellette & Associates, Inc. is offering summer workshops for systems professionals. The four-day workshop program, to be held in Nashua, N.H., will concentrate on how information systems professionals can move out of the back room and position themselves as front-line business partners within their organizations. Nine workshops will be offered, including "Problem Solving for Business Professionals," "Communicating Effectively with End Users" and "Designing and Developing Effective Technical Training." For more information, contact Ouellette & Associates, No. 66, 40 South River Road, Bedford, N.H. 03102.

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Adapso's 70th Management Conference. San Diego, May 14-17 — Contact: Adapso, Office of Public Communications, Suite 300, 1300 N. 17th St., Arlington, Va. 22209.

Information Infrastructure: New Options for Information Providers. San Diego, May 14-17 — Contact: IIA Meeting Department, Suite 800, 555 New Jersey Ave., N.W., Washington, D.C. 20001.

International Conference on Robotics and Automation. Scottsdale, Ariz., May 14-19 — Contact: IEEE Robotics and Automation Council, P.O. Box 3216, Silver Spring, Md. 20901.

Imagineering '89. Milwaukee, May 14-17 — Contact: Candace Dyhr, P.O. Box 7336, Madison, Wis. 53707.

SHARE 72.5 Interim Seminar. Denver, May 14-17 — Contact: SHARE Headquarters, Suite 600, 111 E. Wacker Drive, Chicago, Ill. 60601.

Symposium on Information Management. Kansas City, Mo. May 14-18 — Contact: Business Forms Management Association, Suite 712, 519 S.W. Third Ave., Portland, Ore. 97204.

DB2 Concepts and Facilities. New York, May 15 — Contact: Linda Garcia-Rose, 6th Floor, 220 Fifth Ave., New York, N.Y. 10001.

Distribution/Computer Seminar '89. Chicago, May 15-16 — Contact: C.S. Report, P.O. Box 453, Exton, Pa. 19341.

Sixth Annual Midwest Electronics Exposition. St. Paul, Minn., May 15-19 — Contact: MG Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

International Symposium for Medical Information and Education. Victoria, B.C., Canada, May 15-19 — Contact: IMIA Medical Information & Education, Conference Services, University of Victoria, P.O. Box 1700, Victoria, B.C., Canada V8W 2Y2.

MUMPS Users' Group 18th Annual Meeting. Seattle, May 15-19 — Contact: MUMPS Users' Group, 4321 Hartwick Road, College Park, Md. 20740.

Computer Technology Acquisition. New York, May 16-17 — Contact: Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Amy D. Wahl's Office Systems and Networks Dialogue. Cambridge, Mass., May 16-18 — Contact: Wahl Associates, Suite 240, 555 City Line Ave., Bala Cynwyd, Pa. 19004.

Corporate Electronic Publishing Systems Show and Conference. Chicago, May 16-19 — Contact: Goodwill Communications, Suite 916, 1260 21st St., N.W., Washington, D.C. 20036.

Engineering Workstations Conference: Keynote speaker is Ken Olsen, President of Digital Equipment Corp. Boston, May 16-18 — Contact: Laura Thomas, P.O. Box 3727, Santa Monica, Calif. 90403.

Future of Document Processing Conference. Monterey, Calif., May 16-19 — Contact: Datapoint, 1290 Ridder Park Drive, San Jose, Calif. 95131.

Sage Software's APS User Group Fifth Annual Conference. Bethesda, Md., May 16-19 — Contact: Sage Software, 3200 Tower Oaks Blvd., Rockville, Md. 20852.

Distribution Computer Expo '89. Chicago, May 17-18 — Contact: C.S. Report, P.O. Box 453, Exton, Pa. 19341.

Omicron: The Center for Information Technology Management's Conference. Tarpon Springs, Fla., May 17-19 — Contact: James B. Webber, president, 115 Route 46, Mountain Lakes, N.J. 07046.

Takeover Conference on DEC-IBM Integration. Chicago, May 18-19 — Contact: Center for Technology Concepts, 3 Independence Way, Princeton, N.J. 08540.

DPMA Spring Conference. Fairborn, Ohio, May 19-20 — Contact: Data Processing Management Association, Dayton Chapter, 140 E. Monument Ave., Dayton, Ohio 45402.

Redshaw International User Group Convention. San Diego, May 19-21 — Contact: Redshaw, Foster Plaza Ten, 680 Andersen Drive, Pittsburgh, Pa. 15220.

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UCLA I/S Symposium. Los Angeles, May 21-23 — Contact: University of California, Los Angeles, Information Systems Research Program, The John E. Anderson Graduate School of Management, Los Angeles, Calif. 90024.

Software Publishers Association Spring Symposium. San Diego, May 21-24 — Contact: Software Publishers Association, 1101 Connecticut Ave., N.W., Washington, D.C. 20036.

Testing Computer Software Conference. Washington, D.C., May 22 — Contact: Conference Staff, U.S. Professional Development Institute, Suite 221, 1734 Elton Road, Silver Spring, Md. 20903.

Technology for Today Symposium. Los Angeles, May 22-23 — Contact: California Circuits Association, 5662 Rogers Drive, Huntington, Calif. 92649.

SQL Database Servers: Application Building Benchmarks. Los Angeles, May 22-24 — Contact: Digital Consulting, 9 Windsor St., Andover, Mass. 01810.

Navy Micro '89. Virginia Beach, Va., May 22-25 — Contact: Nardac Norfolk, Navy Micro '89, Norfolk, Va 23511.

Supercomm '89. Anaheim, Calif., May 22-25 — Contact: USTA/TIA, Supercomm Office, Suite 600, 150 N. Michigan Ave., Chicago, Ill. 60601.

Software Engineering Strategies Conference. Vienna, Va., May 23-24 — Contact: The Gartner Group, 56 Top Gallant Road, P.O. Box 10212, Stamford, Conn. 06904.

Conference for Information Engineering Issues. Arlington, Va., May 23-25 — Contact: James Martin Associates, Suite 200, 1050 Centennial Park Drive, Reston, Va. 22091.

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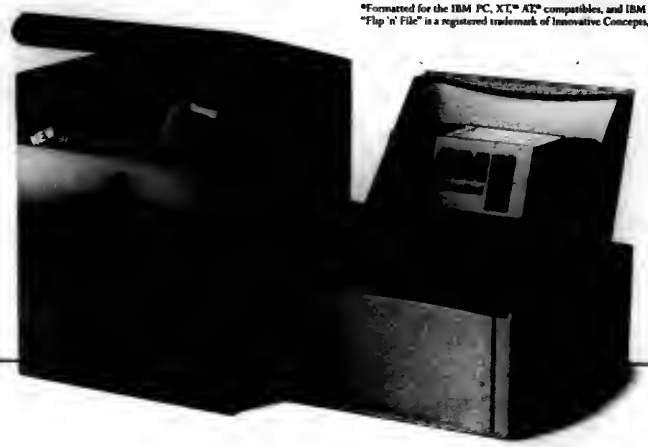

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The difference between conservation and cutoff

BY LARRY STEVENS

You can pack a hall any day with data center managers who are anxious to hear about totally unattended, or "lights-out," operations, but very few of the interested listeners consider themselves ready to feel their way around in total darkness.

"Maybe later," many say as they roll up their sleeves to deal with cost control and service improvement requirements in what they consider more immediate and practical ways.

That is not to say the measures they are taking do not include automation. They certainly do. According to Len Eckhaus, president of the Association for Computer Operations Management (AFCOM) in Orange, Calif., all large-scale data centers are automated in some respect, as are some medium-scale data centers. Tape library and job scheduling systems are the most popular automation areas, with the automation of console systems growing fast.

What is not yet selling widely is the concept of total automation, removing the human element from every aspect of data center operations. No companies have automated first-shift production work yet, says Jeff Schulman, program director of the software management strategies service at the Gartner Group, Inc. in Stamford, Conn.

When companies do attempt some level of unattended operations, they usually have a specific and limited purpose in mind, such as allowing programmers who work on the weekends to use TSO without the help of an operator. The next step, he says, is to automate batch production work during off-shifts.

Even these careful experiments are still the exception, however. For the time being, most data center managers are aiming not for unattended status but selective automation.

ALVIS UPITIS

Pillsbury's Bjelland *isn't in a rush to turn out all the lights*

According to Schulman, the first automation project most companies undertake is to automate their console operations for trivial tasks, such as message suppression. About one-fifth of users are automating 50% to 60% of their console tasks, as well as functions such as job sequencing and the uploading and downloading of programs.

John Bjelland is director of logistics and manufacturing systems at Pillsbury U.S. Foods, a division of Pillsbury Co. in Minneapolis that owns Burger King. He is fairly typical of this group. He recognizes the need for automation in the data center but says he believes it should be approached in a measured manner. "Lights-out status may be a possibility for the future; it's something to strive for," he says. In the meantime, he adds, the real job is to use whatever automation is necessary to get data center expenses under control.

Inevitably, cutting costs translates into some degree of staff reduction. "There is no getting away from the fact," Bjelland says, "that the problem is the cost of people." At one time, hardware used to account for the majority of a data center's budget, he explains. Now, in many instances, employee costs far outstrip hardware expenses.

Salaries are not the only issue either. Companies are also faced with sagging service levels and inefficient utilizations of hardware resources.

Two years ago, for example, Bjelland was forced to grapple with both higher-than-acceptable costs and an outright unacceptable service record at Pillsbury's Miami data center. His orders were to turn the center around within nine months, he says, and that meant eliminating redundant functions and database overlaps, as well as cutting back on service response times.

A predecessor had hired a Big Eight accounting firm to solve the service problems, Bjelland recalls, and its advice was to increase the data center staff from 70 to 127, a move that would have cost several million dollars.

Rather than do that, Bjelland used a combination of standardization and automation to get both problems under control.

He standardized the center's hardware and software, eliminating a lot of redundancy; consolidated positions when possible, reducing the staff to 47; and contracted out jobs and services such as and print and telecommunication. He spent roughly $500,000 on automation software to make the remaining on-site employees as productive as possible. Purchases included job scheduling and client services automation software from Computer Associates International, Inc. and capacity planning software from Best 1.

Clearly, Bjelland recognizes the importance of automation in data center efficiency. And so do other data center managers. Many managers see that automation is becoming more and

Stevens is a free-lance writer based in Springfield, Mass.

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more necessary as data centers continue to grow in complexity and size. They nod knowingly when someone like Gartner's Schulman says, "Systems are quickly becoming too powerful to be controlled by people." They know, as he does, that data center complexity is escalating rapidly.

A few years ago, Schulman points out, an average installation had one operating system and a couple of subsystems and supported perhaps 100 terminals, but now many have three or four systems with multiple subsystems and as many as 10,000 terminals. Even if their own numbers do not agree exactly with his, data center managers acknowledge the trend and agree that the answer does not lie in

Hallmark's Johnson *says lights-out now covers a range of operations*

throwing more people at the problem.

Like Schulman or Rosemary LaChance, co-founder of Farber/LaChance, Inc., a Richmond, Va.-based consulting firm that specializes in data center automation, data center managers know that the increased cost of employees is robbing them of the ability to grow their data centers functionally. Many have looked far enough into the problem to realize that a substantial percentage of errors in data centers now originate with operators and that the percentage is bound to increase as systems become more complex and user demand escalates.

The point at which agreement ends is when conversations turn to the feasibility and desirability of lights-out status.

Although Bjellaod concedes that staff is the major cost factor facing data ceoter managers and realizes that automation was an important factor in turning around the Miami data center, he worries about confusing management issues with technology issues. "You have to simplify before you can add technologies," he says. "If you just buy expensive automated operations equipment and move everything into a dark room but have as many people outside the room monitoring activities, you haven't accomplished anything."

That philosophy jibes very well with Larry Marshall's approach. "It's control we're after, rather than just turning off the lights," says Marshall, who is data center manager at US West Communications in Albuquerque, N.M.

When the company began automating its Tandem Computers, Inc.-dominated data center in 1984, there were no software tools available, so US West created its own in machine language code. Messages that required the same response were responded to automatically. Decision-making logic was added to the software to deal with those messages that required a variety of responses.

According to Marshall, staff elimination really should not be the point of data center automation. Whether some areas are staffless has little bearing on a center's efficiency, he says.

Walter Holston, CCS/IBM data center operations coordinator manager at Neilsen Media Research in Dunedin, Fla., agrees that you should not go into data center automation with staff elimination in mind. "Eventually, if you find yourself staffless in some area and you can switch off the lights, that's fine," he says. "But you don't start off with that as a goal."

Besides, Holston explains, his experience with data center automation products indicates that adopting such products does not guarantee that you will be able to get by with fewer employees.

The market research company has automated most of its operator consoles with products from Candle Corp. and IBM. Both IBM's MPF Facility and Candle's AD Operator are used to handle nonessential message traffic. Candle's AF Operator automatically opens and closes initiators depending on the total resources available.

In the print area, he employs Essential Software, Inc.'s SAR, which is an archival program for print distribution that allows a user to look at a report on the screen and reformat it. Eventually, Holston's plan is to institute electronic report distribution.

Holston says he hopes that these investments will speed service and increase accuracy, and he is also considering tape management systems. But, at least so far, he has not been given much reason to believe that substantially lower staff levels will naturally follow. To date, automation has eliminated only two staff positions.

One reason that the data center remains staff-intensive, Holston says, is that even automation products from the same vendor, such as IBM's, have different user interfaces and thus must be controlled from separate consoles.

These connectivity issues represent a real barrier to lights-out status at many sites, according to AFCOM's Eckhaus.

You cannot move to unattended status, he says, if the systems do not talk to each other. Right now, software for job scheduling, tape library and documentation systems comes from different vendors and does not communicate.

In all probability, this problem will not persist for much longer. Eckhaus says he expects vendors will soon sell products that can interface between systems. Schulman also predicts that the ability to homogenize signals coming from various syatems through a common repository could come within the year.

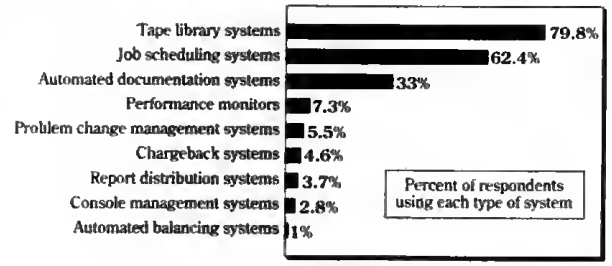
"The problem isn't so much technology as organization," he says. "Sometimes reorganization is necessary before technology can be added."

Stephen J. Shea III, supervisor of computer operations at Du Pont Co. in Newark, Del., knows exactly what Schulman is talking about. Without a reorganization and technology changes, he says, the company would not have been able to consolidate two data centers through remote management of the smaller site.

Right now, the sites are connected by coaxial cables, which provide the larger site with almost complete control of

What the big boys use

Tape library and job scheduling systems are currently the automation favorites at large-scale data centers, but console management systems are expected to gain rapidly



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You can't hurry progress

There are several reasons to consider data center automation, including ease of recovery, according to Mark Levin. "It's simpler to recover an automated environment than a manual one," says Levin, a principal at KPMG Peat Marwick in Boston, a division of the accounting firm that specializes in automation consulting for data centers. Getting from manual operations to automated ones is not always simple, however; Levin recommends that projects of this type proceed in three well-paced stages as follows:

• **Assessment.** Four to six weeks is the average amount of time required to identify automation needs, evaluate payback and reject all but the most necessary projects.

• **Planning.** Another four to eight weeks should be allotted to select which projects to tackle and on what schedule. A well-framed plan can boost the payback significantly, and this stage should not be rushed.

• **Implementation.** The actual implementation must be approached piecemeal and is usually a process that never really stops. A firm's first automation project can take between six months and two years to complete.

To minimize problems and maximize profits, Levin suggests that data center managers adhere to two rules:

1. Never write your own software to automate functions.

2. Treat a data center automation project as a software development project.

Managers often think that writing their own automation software saves money, Levin says, but savings are usually offset by maintenance costs.

The only lesson from software development that data center managers should apply, he says, is resource allocation. Many firms try to implement automation in odd hours using existing staff; it will not work that way. Automation projects need and deserve a full-time manager and staff.

the smaller one. The only staff left in the smaller center, which is a large MVS data center with two IBM mainframes, are two operators per shift to mount tapes. The result of the consolidation was that the company could move 39 data center operators into other areas.

While there is not much new in how Du Pont connected the centers, the move would have been difficult a few years ago, when each data center was controlled by a different supervisor, Shea says. It was only when both data centers were put under a single point of control — Shea — that the move to remote management became feasible. "Technologically," he explains, "we didn't do anything earth-shattering. The real trick was the reorganization."

The reorganization at Du Pont has allowed the company to look at additional ways to implement automated operations, including tape mounting, printing and network control.

An even touchier issue and one that may be longer in resolution is the question of staff termination. Most automation efforts result in some staff cutbacks. In fact, as Eckhaus points out, the data entry area has already been virtually eliminated at many organizations. "Five years ago, 70% of data centers had data entry staff," he says. "Now, only 30% have such staff." At this stage, operators are beginning to feel the crunch.

Ekhaus says companies try to find other options for employees who are displaced by automation — training them for new jobs within the data center or in user departments — but such efforts are not always successful. Full automation of the data center would stretch the assimilation capacities of organizations even further, and not many managers like to think about that.

This is a quandary that even proponents of unattended operations find difficult. At a recent conference on the subject of lights-out operations, for example, all speakers asked reporters not to print any information about projected staff reductions.

LaChance, who lectures frequently on the subject of unattended operations and consults with a number of companies with that in mind, counsels that the term "lights-out" is probably best avoided because it implies a totally staffless operation.

Although LaChance and her partner, Arnold Farber (see story page 96) both believe that data centers will eventually be able to run without personnel, they believe that day is still some time off and that, by the time it comes, new positions will have been created for affected staff members. Nevertheless, LaChance recognizes that, for many data center employees, the term produces visions of joblessness and encourages resistance to automation.

That is one point on which LaChance and George Kurtz can agree. Kurtz, an automation consultant who recently formed Comtech, Inc., a Libertyville, Ill., consulting firm specializing in data center automation training and counseling, opposes the basic concept that the labels lights-out and unattended operations imply. He is just as worried about misusing terms as he is wary of overusing automation technology. "Automated operations should be seen as a challenge, not a threat," he says. "Terms like those send out the wrong signals to the staff and signal a breach in trust. If 'unattended' is not what is meant, then don't say it."

In fact, some who use the term may not really intend what it suggests. Somewhere along the way, the definition of lights-out has turned slippery.

Jim Johnson, director of the data center at Hallmark Cards, Inc. in Kansas City, Mo., says he thinks the phrase has lost its original meaning and is now an umbrella term that covers a range of automated operations.

With that in mind, he says his company is working hard to dim the lights. He has decreased the data entry staff by allowing users to enter their own data, he has begun a number of automated console operations, and he uses a report-viewing package to reduce staff needed for report printing. Before long, he will also have on-line demand printing. And he has increased to 500 the number of data sets allowed on disk, which will eliminate about 20% of tape mounting.

For console automation, Johnson uses OPS/MVS, which takes action on messages and can automatically provide a series of responses. For network management, he uses IBM's Netview.

In the data entry area, Johnson uses H&M Systems Software, Inc.'s Keyfast. A host data entry package, this product has allowed him to eliminate a second shift in data entry.

For the disk room, the data center is using IBM's HSM to control the disks remotely.

In the course of all this automation, Johnson has been able to leave unattended one 7,000-square-foot area where direct access storage devices are located. But he does not measure efficiency by how many rooms are dark. "We don't have a specific goal of turning off the lights by a certain date," he says. "We're just streamlining, and gradually we'll turn off the lights in a few rooms."

The question of what lights-out really means gets even trickier when you talk to Jack Reed, principal specialist in systems programming at McDonnell Douglas Aerospace Information Services in St. Louis.

The Information Services data center supports a large number of departmental machines performing business and avionics functions. Reed says the company has consolidated the control of many of the consoles that monitor and manage the traffic on the departmental machines using Docs from Smartech Systems, Inc. in Dallas. The software package is used for message suppression and rerouting, which allows him to control the consoles remotely. Auto-replay and programmable function keys allow him to use fewer operators.

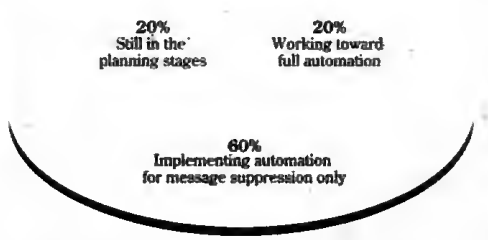
The machines themselves, though now operatorless, are located at the user communities — hardly lights-out environments. The users access the machines, but when a problem arises, it is solved by the operator at the central location.

"If we placed the remote processors in a closet, it would be called lights-out. But in terms of functionality, there is little difference between having no operator and no lights," he says.

Sometime, perhaps in the near future, all of the theories and definitions will coalesce into a clear picture of what lights-out operations really means, and some working models will surface. In the meantime, however, most users are keeping the fog lights on and their eyes on the spots where the need for automation is most evident. •

Stages of automation

Of 350 companies surveyed, 70% were either planning or working on data center automation; few of those firms, however, were actively pursuing unattended status



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Advice from three who've been there

"Take a thorough look at what products are available before making a purchase."

Gary Groce, lead systems programmer at R. J. Reynolds, Inc.'s RJR Tobacco International subsidiary in Winston-Salem, N.C., learned that lesson the hard way when he first attempted to automate his data center four years ago. Groce says his initial attempt failed because he did not shop around; instead, he chose all IBM products, which turned out to be too inflexible and cumbersome.

Groce eventually stopped using those products, researched the market thoroughly and chose WTO/Manager from Boole & Babbage, Inc. for message automation and Rasp from Ayde Software Solutions, Inc. to automate operator functions. The company was a development test site for Ayde Software's product. Both automation projects began in mid-1985 and have not yet been completed.

Other areas Groce has automated include message suppression and response, initial program load and shutdown and restart of failing networks on on-line systems.

Benefits derived from automation? Groce says it has reduced master console operator head count by 25% and reduced both scheduled and unscheduled outage time. He adds that the automation has not resulted in any layoffs. Affected employees were either given jobs in other areas of the data center or placed elsewhere in the company.

"Jump in and try it. It's not as hard as you think."

That is the advice Chris Brown, a systems programmer at Mack Trucks, Inc. in Allentown, Pa., offers to managers who are thinking about automating areas of their data centers. Brown, who has automated inventory, accounting and other functions, also suggests managers start by automating functions that manage jobs running on the system and how those jobs interact with the operating systems.

Within the past year and a half, Brown consolidated four data centers into 2½. He began automating Mack Trucks' data centers five years ago using in-house tools and public domain software. As his needs became too sophisticated to handle internally, he purchased Automate/MVS from Legent Corp.

Benefits derived from automation? "It is rather nebulous," Brown freely admits. "But the more you automate, the easier data processing becomes. I can tell you that we would never want to go back to the way things were before we started automating."

"Don't delay the automation process. Make sure that the changes are orderly and disciplined and announced in advance so that everyone knows what is going on."

Jean-Marc Blondin, operations manager at Regie de l'Assurance Automobile in Quebec City, picked up that piece of wisdom in the course of automating his master console operations last year using AF/Operator and AF/Remote from Candle Corp. The console management products eliminate the need for operator intervention unless something goes wrong, in which case the system will automatically page an employee to fix the problem.

On a more technical level, Blondin also suggests that data center managers undertaking console automation establish tables that are easy to update and reduce the number of C lists or programmed actions required. Both of these measures will serve to decrease maintenance costs in the long run.

Benefits derived from automation? The productivity of the automobile company's systems increased by 100 hours per year, and system service availability is markedly improved, Blondin says: "Things are getting done faster and more accurately."

In addition, he adds that the console management system has also improved the quality of life of the data center operators, who no longer have to work night shifts or weekends.

Rallying the ranks to change

The easiest and fastest way to torpedo a data center automation effort is to set events in motion without a complete strategy for handling staff concerns and managing staff participation.

"Your staff has the power to make a plan successful or to seriously hinder it," says Stephen J. Shea III, supervisor of computer operations at Du Pont Co. in Newark, Del. "Getting the staff on your side is of extreme importance."

One way Du Pont went about ensuring that data center employees would remain allies throughout its automation efforts was to state quickly and clearly that elimination of a job was not going to be synonymous with elimination of an employee. The company made an absolute commitment to maintain any workers who wanted to remain after the data center's reorganization. It instituted job posting, retraining and counseling programs to achieve that goal.

Not all of the apprehensions of existing staff revolve around job security. Data center personnel facing automation also worry about whether they will be able to handle the new responsibilities that will come their way when their jobs are redefined.

"People are naturally reluctant to change, especially when change requires that they learn new skills or give up power," says Norbert J. Kubilus, vice-president of management services at Optimal Solutions, Inc. in Hoboken, N.J.

It is not reasonable to expect that all of these apprehensions can be alleviated before the fact, Kubilus says. Some anxiety is expected and will persist until employees have settled into their new routines.

Still, general morale can be improved if there are frequent staff meetings before the fact, which emphasize positive changes such as job enrichment and improved efficiency.

> "IF YOU treat workers right in the first project, the next one will be that much easier. If you don't, the next one may be impossible."
>
> STEPHEN J. SHEA III
> DU PONT

Actively involving employees in the planning process is a good way to win their approval and improve the effectiveness of automation projects, Shea says. The extent of involvement, however, should be kept within appropriate bounds. For example, he explains, although data center employees should be encouraged to use their knowledge about procedures and standards to make recommendations, it is a mistake to rely on them for suggestions about which positions to eliminate.

Once the transition is completed, employees whose jobs or responsibilities have changed must be supported until they are comfortable. That might mean postponing scheduled evaluations or increasing the estimated time for training.

According to Kubilus, it is a common mistake to underestimate the time it will take for workers to pick up new skills after displacement. A little patience invested at this stage will eventually pay off, he advises.

Even if it does take workers longer than expected to be retrained, the time is almost certainly less than that necessary to train new employees.

There is, as Shea points out, no substitute for doing right by employees in the very first round of data center automation. "You are going to want to automate other parts of the organization," he says. "If you treat workers right in the first project, the next one will be that much easier. If you don't, the next one may be all but impossible."

LARRY STEVENS

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An advanced concept in helicopter dipping sonar will provide a significant increase in anti-submarine warfare (ASW) capability. Under development by Hughes Aircraft Company for the U.S. Navy's Airborne Low Frequency Sonar (ALFS) program, the new sonar is designed to operate from both the LAMPS MKIII and the CV helicopters. This will enhance the Navy's Airborne ASW effectiveness in both inner and middle zones of battle group deployment. Hughes, and its teammate Thompson Sintra ASM, will demonstrate the performance of this new sonar in flight tests aboard an SH-60B helicopter in early 1989. The team's ALFS concept embodies leading-edge technologies in the areas of high gain acoustic arrays, electro-mechanical kinematics, fluid dynamics, signal processing and man-machine interfaces.

A new test fixture precisely determines the capabilities of integrated circuit chips with frequencies up to nine gigahertz. Developed by Hughes, it provides clear electrical characterizations of gallium arsenide chips, which operate six times faster than chips made of silicon. Accurate information about how these chips perform under a variety of conditions is required before a circuit can be designed. The new test fixture can be used to generate data showing component performance characteristics such as voltage, current, and frequency as functions of environmental stress.

Application of integrated circuit processing technology may lead to higher density packaging. For the U.S. Navy's VLSIC Packaging Technology (VPT) program, Hughes will apply its high-density multichip interconnect (HDMI) technique which uses integrated circuit processing technology to build the substrate circuitry in a hybrid package. The polymide dielectric used in the HDMI process is considered excellent for high-frequency device applications. The packaging technique is aimed at meeting the need for higher density hybrid microelectronics to take advantage of the next generation of integration using Very High Speed Integrated Circuits (VHSIC-II) chips.

Large Scale Integrated (LSI) chips using advanced gallium arsenide (GaAs) technology will handle signal processing functions with fewer components and faster rates. The chips are being designed by Hughes for AT&T-Bell Laboratories under a Defense Advanced Research Project Agency pilot-line contract to fabricate high performance gallium arsenide integrated circuits. These circuits will feature gate densities as high as 5,000 logic gates, which translates to about 35,000 to 45,000 transistors per chip. By using heterostructure FET source follower logic (SFL), the chips will operate at a 200-megahertz clock rate, or about ten times the speed of conventional CMOS based chips. Applications for the new integrated circuits include the Strategic Defense Initiative and other military systems that need low-power, high-speed, radiation-tolerant LSI technology.

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INTERVIEW

Darkness at the end of the tunnel

Unattended operations is not only a realistic possibility, it will eventually be a business necessity, says Arnold Farber. When you take people out of the process, the errors disappear.

The lights are still blazing in most data centers, and many people say they believe totally unattended operations is nothing more than a figment of fertile imaginations. Arnold Farber sees a very different future, however. The closer the calendar inches toward the 21st century, he says, the darker the operations area will become. Once a vice-president of operations himself, Farber is now president of Farber/LaChance, Inc., a consulting firm in Richmond, Va., that specializes in data center automation. He recently spoke with *Computerworld* Assistant Editor Sharon Baker about the benefits and possible consequences of full-scale automation.

How do you define unattended, or "lights-out," operations?
Processing the work from start to finish with no human intervention. The concept is that the user initiates the work, and the automated system picks up the request and then processes the work, from start to finish, without any human intervention.

It doesn't have to imply that all the human functions within the data center are eliminated. People can be involved before and after the processing, just not during it.

But won't this result in eliminating large numbers of employees?
Yes, eventually it will, but you're trying to become more productive. As you incorporate automated packages that will help you achieve unattended operations, you're going to see a lot of productivity gains as a by-product. And these productivity gains will involve job elimination. But you can handle some of that through attrition.

I'm not implying that you won't have a staff reduction. We see shops having a reduction from 30% to 50% as they move forward with their unattended projects. But they're usually [coping with this reduction] through attrition and placing people into other jobs. The idea is to get people into more responsible, productive situations.

If there are fewer people working in the data center, what happens when a problem or failure occurs?
One company I work with that recently instituted an unattended shift in its data center from 9:30 p.m. to 5:30 a.m. told me that it only had two major failures during the unattended time frame in the last 138 days, which is really phenomenal. People are more a part of the problem than we realize. As companies clean up processes, automate them and allow the correct function to be handled by a machine, mistakes won't occur.

Human errors can cause problems, but aren't there some problems that only employees can handle manually? For example, what or who took care of the problems that occurred during the unattended shift at the company you mentioned?
The best way to take care of that is through dial-up processes, which is how the company I just mentioned handled their two failures. What firms like that one are doing is incorporating dial-up console management packages that address messages on the console, trap those messages and, if a problem cannot be handled automatically, dial an on-call employee who comes into the data center and takes care of the problem. There are several different packages today that can do that.

Is unattended operations a practical objective in the near future?
It is a practical objective for some segment of time. I wouldn't say you're going to see a data center truly unattended 24 hours a day in the near future, but there are shops that are running unattended anywhere from two to six hours a night. Companies are also leaving their data centers unattended on weekends and holidays.

Do organizations that currently have unattended operations during the night shifts really have more ambitious goals?
Most of them have larger objectives, but they are just beginning the process, feeling it out. It's more of an evolution than a revolution. The biggest challenge is getting people to think in terms of automated vs. manual. That's quite a transition. The software available for automated processes is virtually new to the industry. I think we have just touched the tip of the iceberg.

THE PROBLEM is that companies really don't believe that unattended operations is feasible. As they see it can happen, they'll work toward a lights-out data center.

What is the biggest roadblock?
The real roadblock to unattended and automated data centers is people and their resistance to change. It takes a strong commitment from management to get people to come in and modify the existing processes so that the automated software can really perform its job. Data centers are slow to move, slow to change their processes and catch on to what's available to them.

Are there any pieces of technology that are still missing?
There's a big void in products that address environmental issues. There are some basic systems out there, but if you automate your data center and you don't have anybody around, there's no one available to address problems like power failures, fire, water, air-conditioning and so on. Some systems have been brought out to address this, but they're really not sophisticated enough to handle a true, unattended environment. They still require monitoring.

And you think even that is dispensable?
Eventually, systems will exist that, in the event of a fire, can automatically turn on the sprinklers, notify the fire department and alert management if a problem exists. Those systems will be able to take care of any functions that a human would normally take care of. But such systems will never preclude human involvement in managing the process [of putting out the fire and dealing with its aftermath]. At some point, people do have to get involved.

What are some of the other missing pieces?
There are some voids in the hardware area. IBM still develops hardware that needs people interfaces. If a firm is going to be automated, it can't have somebody pushing a button to start a process. We need hardware

Question 1.

In the MVS Automated Operations market, one vendor outsold all the others in 1988.

Which vendor?

- [ ] Altai
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- [ ] Candle Corporation
- [ ] Cincom Systems
- [x] Computer Associates
- [ ] Duquesne Systems
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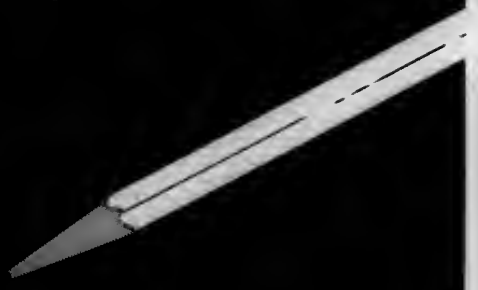

Question 2.

Out of all the Automated System Operations products, one was named by the Gartner Group as the "Technology Leader" for the second year in a row in January 1989.

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- ☐ AF/Operator V210 from Candle
- ☐ Automate/MVS R2 from Duquesne
- ☐ CA-Opera from Computer Associates
- ☐ MVS AutoOPERATOR from Boole & Babbage
- ☐ ODDS from Software Engineering
- ☐ OPS/MVS 1.37 from MVS Software
- ☒ Sys/Master from Cincom
- ☐ WTO Manager from Empact
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that will work with the CPU and bring itself back up when there is a problem.

There's also a big void in the IBM-supplied automated software. IBM's software is not as sophisticated as [products from] some of the third-party vendors or the independent software vendors. IBM needs to bring its systems around to interface better with some of the other automated software that is available.

How long do you think it will be before all the pieces do exist?

I think in the next one to two years, you're going to see the basic unattended data center in production. You won't see shops fully unattended 24 hours a day, but you will see shops eliminating the 12-to-8 shift, the weekends and the holidays. This will still be leading edge but it will be closer to becoming the norm.

Even when all the technology is in place, do you expect that a large number of companies will really want to move to totally unattended operations?

Many firms say that a dim data center is feasible, and they're going to work hard toward that. The problem, however, is that companies really don't believe that unattended operations is feasible. So when a company says that it's not working toward a lights-out data center, it's because, subconsciously, it doesn't think lights-out is possible yet. As companies see that it is a reality and it can happen, then you're going to see companies moving to fully unattended operations.

And how long do you expect it will be before this happens?

Within the next three to five years, I think everybody is going to jump on the bandwagon.

Why? What is the motivation?

The users, the customers of the data center, are the driving factor. Users are saying they need to have automated systems to interface with. We're giving outside customers access to machines that do the work for them, and we need to do the same thing in the data center.

Isn't some of the motivation economic?

Yes. Information systems is becoming a competitive business, and we're going to have to start running it as a business. When you're talking about the volume in dollars that a data center can consume, it's got to be run as a business unit and automation is a business solution.

Would you ever recommend against an organization moving this way?

No. I think automation is much more reliable than doing something manually. It's more reliable, more efficient and more effective than manual, and there's no one who can tell me, point for point, that it's more effective to have people involved.

Today, automation is a business decision. In order for the data center to survive, it's going to have to be automated. There really is no alternative. We're going to have to get to unattended operations. The question is, how quickly will we get there?

What concerns do you hear expressed most frequently from people who approach you and want to move in this direction?

The biggest concern is people. "How do I address this with my staff; how do I suggest that we move in this direction without losing our good people?" I tell them to start the education process early. That's the most important thing, even more important than the technology. If management and staff understand what the objectives are, what you're trying to accomplish, where you're going, that people will get better and more sophisticated jobs and more responsibility and get rid of the routine, mundane, repetitious stuff where we tend to make mistakes and errors, then the fear tends to subside and people create a team atmosphere to work together and make it happen.

But many people, including Len Eckhaus, president of the Association for Computer Operations Management, say that right now, a large percentage of displaced personnel are not being retrained or reassigned.

I disagree. I'm not going to dispute numbers, but the majority of companies that I work with are retraining employees, not laying them off. I stress very heavily that education, training, advancement and elimination through attrition — not through layoffs — is the way companies should handle this. Those companies that are laying off employees are going to find it more difficult to move ahead in the advanced stages of automation, because if you don't involve those people, it could definitely impact the success of a project.

Your firm has become identified with the concept of unattended operations. How did you become so involved with this idea?

It was a matter of survival in the beginning. Back in 1979, I was vice-president of operations at a data center for a financial institution, and the staff was constantly growing and the interfaces were just getting out of control. It occurred to me that I needed to do something or else I was not going to remain there very long. So I started looking at the products that were available at the time. What we found was that if we tied certain products together, we could create an efficient process that was easier on our people, and the easier we made it on them, the more efficient we became. •

"In just three weeks, our card in Computerworld's Card Deck generated over 300 leads — and many were from buyers whose leads quickly translated into sales."

— Gary Stevens
Vice President
Technology Solutions, Inc.

"We can help manage technological change." That's the charter of Technology Solutions, Inc., a marketer of PC products in Herndon, VA. According to Vice President Gary Stevens, ScriptWriter, the Electronic Clipboard, can help users do just that.

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"Then we chose *Computerworld's* Response Card Deck. I've subscribed to *Computerworld* for many years and I've always considered it to be the newspaper that hits high-level MIS/DP people — those who buy. Unlike PC books which are focused on gadgets for PCs only, *Computerworld* covers and reaches the whole MIS/DP industry.

"Our choice was definitely the right choice. In just three weeks, our card in *Computerworld's* Response Card Deck generated over 300 leads — more than double our original goal. And these were high-quality leads. We didn't get basic information collectors that local newspaper ads generally attract. We heard from professionals who were genuinely interested and had a real need for the product. And many were from buyers who quickly translated into sales.

"We were very pleased — and, admittedly, even a little surprised — with our success rate. But the message is clear. And, in the future when we're looking at dollars for advertising, our first dollars will definitely go to *Computerworld* Response Card Decks."

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Task du jour: Select the slices to automate

BY GEORGE E. KURTZ

It is true that the time clock is running on data center automation. A data center manager who has not taken some steps in this direction should realize that he will soon be five or more years behind his competitors. But even if you are late off the mark, it is important to pause long enough to plot your course.

The final decision on what to automate and in what order will depend, to a large extent, on environmental factors and service requirements. Still, there are some generalities that should be weighed against the particulars of your situation. You may choose to follow a different path for your own reasons, but the following areas for automation are set up in what could be regarded as a general order of importance.

• **Applications management.** Applications represent the highest payback area in data center automation, particularly because they can be automated without large capital investment. The first task you should undertake is to get rid of all the date and control parameters, console messages and special processing requests. Then, in order to reap the fullest benefits, minimize tape mounts, set up a design for remote printing and install report balancing.

• **Scheduling.** Functions that involve scheduling already make up the heart of automated operations and will become even more important in the future. Today's basic scheduler functions include automatic job selection, job submission, sequence enforcement, job tracking, on-line job status and work load planning. Not one of these tasks can be performed as cheaply, as quickly or as well on a manual basis as they can with the automated products now available.

THE FINAL decision on what to automate and in what order will depend on environmental factors and service requirements.

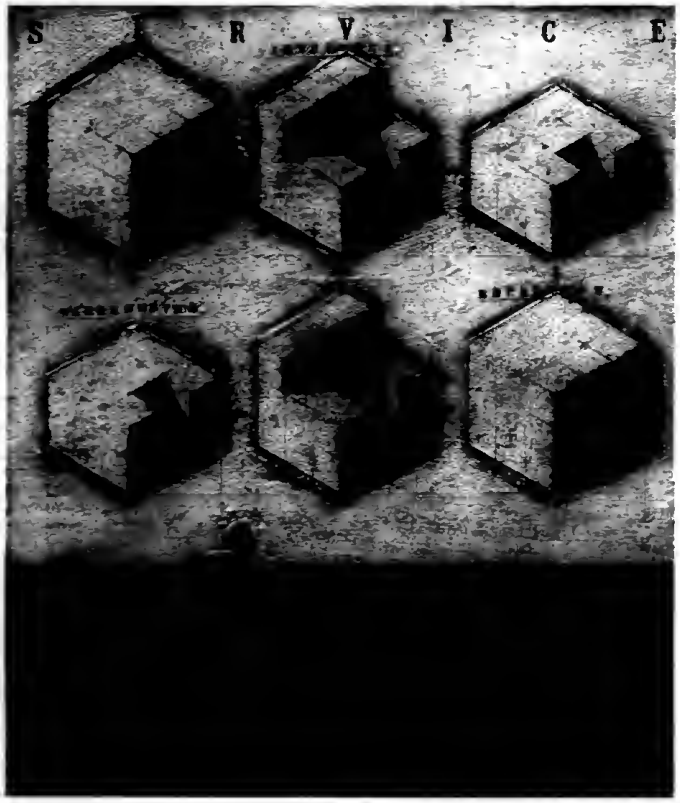
• **Console management.** Automated console management products can perform most of the traditional console operator functions. The key to success with such tools is to avoid those that use a program language. Using programming languages is labor-intensive, often demanding the time of two people — one to generate the ideas and one to translate those ideas into code. Furthermore, maintaining programs is expensive, as many firms have found out on the application development side.

• **Report distribution and tracking.** One of the main services a data center provides is delivery of reports — accurately and on time. The rapid rise in the number and volume of reports most data centers produce has made it increasingly difficult to deliver reports in a timely manner. There are several software tools available that will provide total end-to-end control, tracking reports directly to a client's desk with the help of bar codes.

• **Job recovery.** This is probably one of the most frustrating and time-consuming tasks operations must perform. It is also one of the most error-prone, which means that failures are often compounded by delays. Today's job recovery software automates abend chores such as cleaning up catalogs, scratching unneeded data sets on disk and tape, adjusting the generation data group data set bias numbers and automatically selecting the restart step. Such software can also provide extensive tracking and spoilage reporting.

• **Documentation.** In centers in which it is handled manually, documentation is almost always out of date and scattered

Continued on page 100



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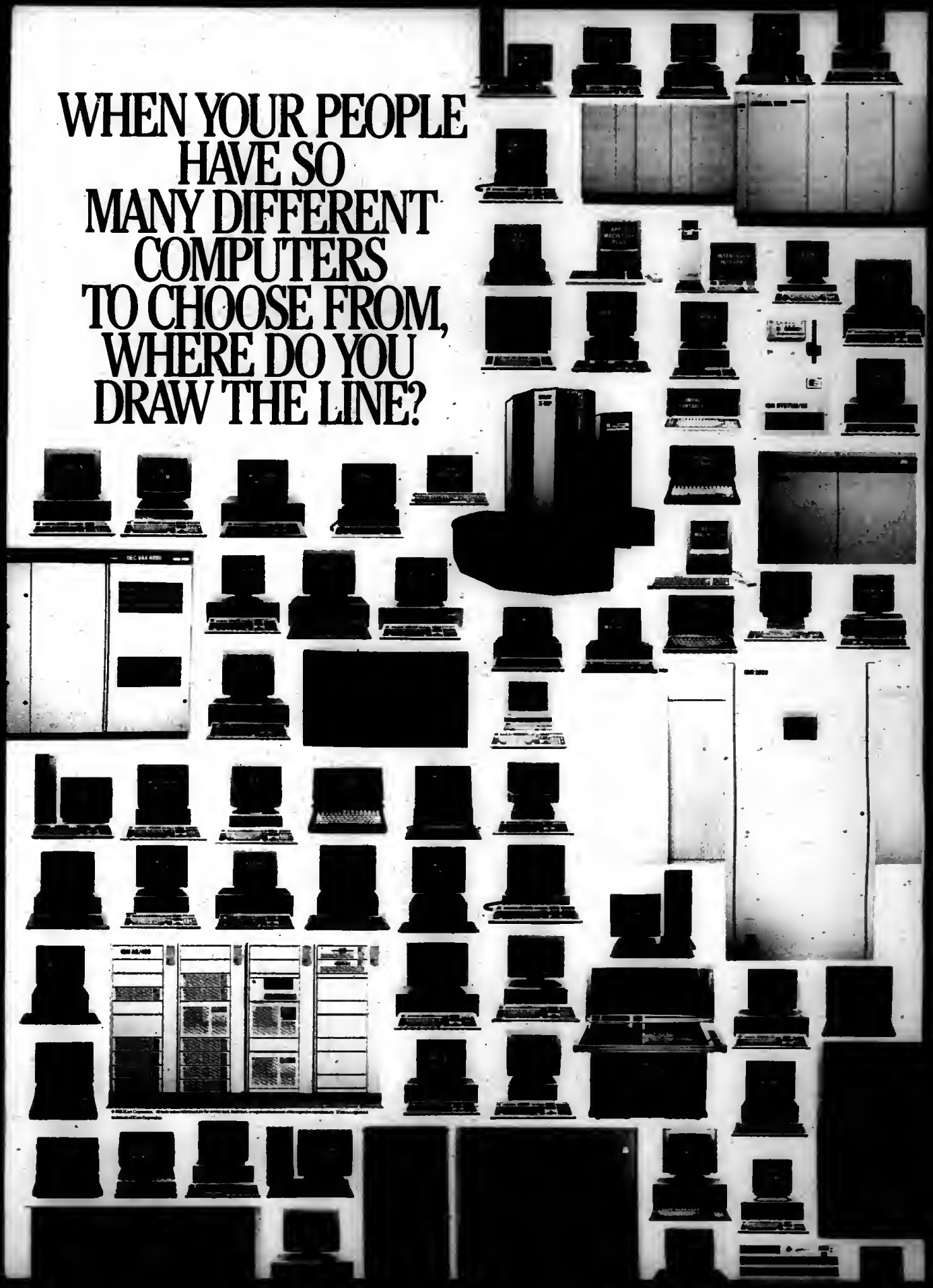

Slices

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throughout numerous departments, resulting in lags in the production cycle and occasional duplication of effort. With documentation and job control language (JCL) management tools, documentation can be centralized in a data dictionary, so everyone is working with the same data. Today, the only accurate documentation normally found in operations is PROCLIB, or JCL procedure library.

• **JCL testing.** Right now, most data centers test JCL by running it in production. Mixing testing and production always causes problems, however, because the testing procedures often interfere with the production work. There are a few tools that are relatively inexpensive that permit in-depth editing and testing of JCL before it is run in production. Tools that are used in the testing environment can help eliminate up to 95% of the problems that might crop up in the production cycle.

• **Tape management.** Products to automate tape management have been around for almost 20 years; as a result, tape management is an area that most data centers have already automated. Those systems that were installed several years ago should be upgraded, even though the technology has not changed a great deal. Current automated tape management systems now offer positive control of tape files, elimination of most tape labels and prevention of accidental scratching of tapes.

• **DASD management.** Most data centers are wasting between 40% to 70% of their disk space. Automating this function can reduce waste significantly in areas such as volume pooling, data archiving, automatic data retrieval and automatic blocking and performance monitoring. However, direct-access storage device (DASD) management is almost totally standards-driven; in some cases, no standards exist at all. Without good standards, the benefits of today's DASD management tools will be limited. The best approach you can take when searching for a DASD management tool is to thoroughly define what the tool needs to accomplish, how it will be administered and how it will be used.

Applications represent the highest payback area because they can be automated without large capital investment.

• **Problem/change/configuration management.** Automation of these functions is not easy to administer because it tends to enforce a certain structure, and data processing cannot always be structured. However, automating this area is a must for every shop. Automated tools will help standardize problem recording, change control and management of the thousands of hardware and software components that make up the data center's complex network.

• **Report balancing.** Although applications should have run-to-run controls as part of their design, most do not. As a result, report balancing can occupy an inordinate amount of time in the data center. In shops in which application designers are being required to design and install these controls, tools to automate this function will reap substantial time savings on that end.

The preceding is merely a starter list. There are a number of other areas in which automation can yield substantial benefits. Once you have begun to look at these core areas, allowing sufficient time for your vision to adjust, other pieces will suggest themselves. It is important that you do not rush the evaluation process, but be careful not to overanalyze it. In the long run, a well-integrated set of automation tools that form a system will last longer and pay off better than stand-alone products. •

Kurtz, an automation consultant, recently formed Comtech, Inc., a consulting company based in Libertyville, Ill., that specializes in data center automation training and counseling.

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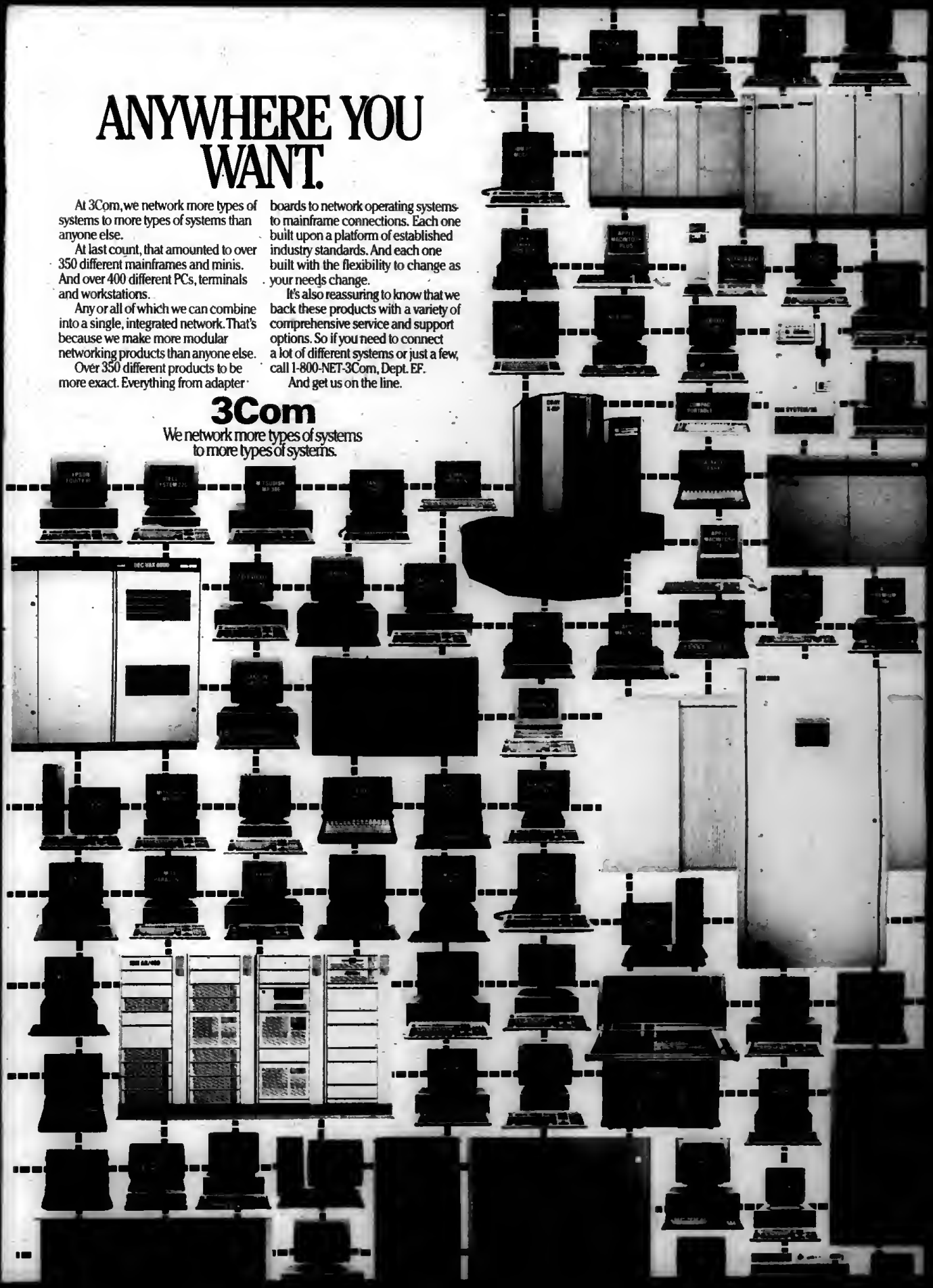

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Right data, wrong time?

Tips on implementing referential integrity in DB2 and other RDBMSs

BY MIKE GIOVINAZZO
and JOHN CROFT

In the past, IBM's DB2 database management system for mainframes has received substantial criticism from industry observers for its lack of support for referential integrity, a feature that many in information systems management feel is essential in any truly relational DBMS.

IBM has recently answered its critics by releasing DB2 Version 2.1, which offers some support for referential integrity.

While this may rightly be seen as a major step forward, it is worthwhile to ask what impact this new capability will have on those IS departments that currently use DB2, or are planning to use it, for production and end-user systems.

First, a simplified review of the concept is in order: Referential integrity is the automatic enforcement of referential constraints by the DBMS during data-modification processes such as insertion, deletion or update. Such constraints ensure that data containing a non-null foreign key value cannot be entered in a table without the same value occurring as a primary key value in a related table.

A number of advantages arise when referential integrity is implemented in the DBMS software instead of in the application software:

- It is based on actual business rules, rather than on an interpretation of those rules by an analyst or application program. Thus, referential integrity is implemented across all application systems.
- It is transparent to both programmers and end users, simplifying the maintenance of data by both of these DBMS user groups and reducing application development time.
- It improves performance by eliminating the need to transfer data between the DBMS and the application or end-user system.
- It does the necessary consistency-checking automatically, reducing the amount of I/O required to perform referential checks. There are still other forms of integrity testing that are not necessarily referential that may require manual application testing.
- It improves data reliability and consistency by always enforcing data-relationship rules, thus resulting in improved confidence in the data presented.
- It avoids compromising the relational model by imposing a fixed hierarchical or network structure on the data.

MANUEL KING

The disadvantages

While these benefits may cause many in IS to want referential integrity in their RDBMS, there are costs arising from its introduction into DB2 that must be considered. At first glance, the risks of not utilizing the DBMS referential feature appear small. Typical arguments against its implementation are that systems have been implemented without such a feature, and although there may have been consistency problems, these have not usually been catastrophic in nature.

Additionally, you may have insufficient IS personnel to perform the data and systems surveys required; once the feature is used, there will be the added responsibility of controlling and implementing it across the existing systems.

A few adventurous IS organizations will attempt pilot implementations, but few will carry these efforts forward unless there is a clear understanding of the impact of not using this DBMS feature. Unfortunately, as each new system is built without utilising the referential capability, it will become increasingly more difficult to retrofit DBMS referential constraints into applications and obtain the benefits.

The longer you wait to implement referential integrity, the harder it will be to fully understand its corporate data dependencies and relationships. Inconsistencies in implementing the referential rules will proliferate as each systems designer and programmer interprets the differing business requirements. The amount of code developed to support this function will increase and therefore so will the overall systems maintenance overhead.

Consider, for example, a transportation company that develops

Giovinazzo is manager of consulting services at Polaris Consulting Services Ltd., a Toronto-based consulting organization that specializes in the design and implementation of major DBMS and fourth-generation language applications. Croft is a principal at Polaris and heads a team of DB2 specialists.

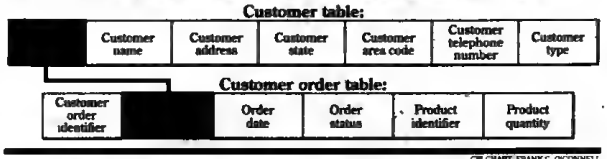
- **Transparent to all types of users**
- **Doesn't compromise relational model**
- **The costs of adding the feature**

independent systems to control passenger and baggage handling. The result could be that although the passengers and baggage may arrive at their destinations successfully, they may not arrive at the same time. The same is true of computer systems developed to handle associated data. Inconsistencies and/or missing data will lead to confusion among users and will result in an overall dissatisfaction with the services offered.

Thus, there are many good reasons to proceed with implementing referential integrity into your DBMS. The following practical steps can maximize the benefits and minimize the costs of referential integrity: You should review data models, survey physical database design, implement fully supported constraints, assess impact on application and end-user systems, perform a trial implementation, implement partially supported constraints and avoid duplicate reference-check tests.

Implementing referential constraints

Only constraints that can be fully supported by a current design - such as the customer identifier index in the example below - should be considered for referential integrity



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• **Review all data models.** Before attempting to implement referential integrity, it is worthwhile to review all data models used with the information system to ensure that any initial assumptions made by the users and data modelers are understood.

Many methodologies used in the modeling process require that information about relationships between entities and attributes be gathered and recorded either graphically or descriptively, yet information concerning data references is not always recorded. Where data-reference information is absent, administrators must review data-usage requirements with corporate management and application and end users to ensure that all current and future requirements are incorporated into a new logical data model.

• **Survey physical database design.** With the fully documented logical model in hand, the next step is to survey the physical database design. Take special note of key analysis performed during the transformation stage; such analysis should relate back to the referential integrity requirements to determine which of the rules are supported by the current design.

It is also important to keep track of any attributes that have been denormalized so that the physical constraints of the DBMS or the application system can be circumvented.

• **Start by implementing only fully supported constraints.** Only the referential constraints that can be fully supported by a current design should be considered for implementation. Fully supported references are identified by indexes containing only those attributes required to support the reference. Ideally, such indexes contain only the minimum attributes required for support, but it is sufficient if the indexes specify the attributes in the same sequence as the primary key of the parent table.

Consider the two tables in the figure above as an example. If the primary key for the customer table was the customer ID and if there was an index on the customer order table that contained the customer ID as the most significant field, then it would be relatively simple to implement a referential integrity constraint between these two tables using the customer ID.

However, if there was an index on the customer order table

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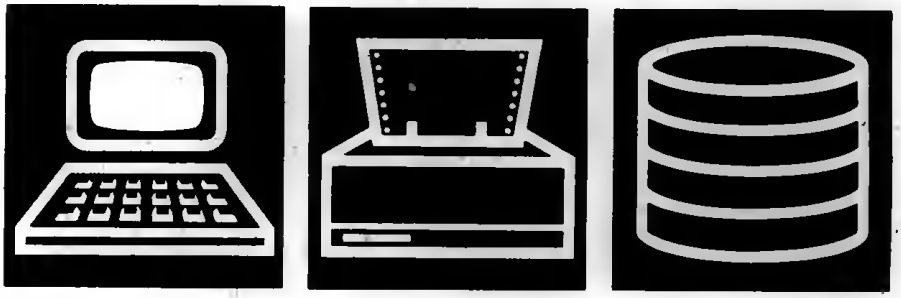

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Dallas, Texas
March 1, 1989

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Craig: It took three or more minutes to issue a ticket, which was not acceptable. You helped us design our ticketing solution based on AT&T WorkGroup Systems computers.

Tim: And today you have happier customers!

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Craig: Since we can't afford downtime, your top-to-bottom commitment to supporting the total solution sold us on AT&T. We saw you as a partner for computer solutions, not a PC vendor. Anyone can sell PCs or minis.

Dennis: You were the only computer company with a nationwide service network and the willingness to respond to us on demand.

Craig: We won't stop with passenger ticketing. Distributed computer networking is our leverage to improve package express service in a major way.

Dennis: We are tying our networks together. Whether it's packages or people, it's one screen.

Tim: And the distributed solution includes the bus scheduling system running on both your Tandem computer in Omaha and the IBM mainframe in Des Moines.

Craig: The AT&T system is open. And it has growth capabilities, so that when we see an opportunity, we can take it. I'm very proud of what we've done. As our motto says, "the bus is back."

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that contained either the order ID, order date or product ID as a more significant field, then the referential constraint would be costly to implement because of the need to process more rows in the customer order table when enforcing the constraint.

The ideal solution here is to construct a new index on the customer order table containing only the customer ID or using that field as the most significant.

Partial referential constraints should not be implemented at this stage. They risk rejection for reasons of performance or unavailability of development personnel. This rejection would then lead to reduced levels of confidence in the data on the users' part because the integrity and reliability of the data across all systems is not guaranteed — a lack of full referential integrity.

There is also the risk that significant overhead will be needed to perform reference checks if indexes are not established on the foreign keys in the candidate tables. Without an index, all the data in the foreign-key table would have to be scanned.

IT IS useful to measure resource consumption before and after implementing referential integrity to determine if benefits were achieved in actual conditions.

• Assess impact on application and end-user systems. Having chosen some referential constraints meeting the above criteria, the application and end-user systems using the data should now be surveyed for impact. Assessment should include the effort required for referential integrity implementation, plus other development efforts that may be delayed as a result. Do not forget the effect on recovery time caused by the need to ensure maintenance of referential integrity after a recovery process and the impact on present and future developments, data reliability and such benefits as reduced code complexity and shortened response time.

You should retain documented cases of effort required to resolve data anomalies because these may be used in the future to support the case for the implementation of the referential constraint through DB2 rather than the applications.

• Perform a trial implementation. To select which referential constraint should be employed in a trial implementation, simply determine arithmetically which constraint has the least impact and the most benefit. This initial implementation selection should be used as a pilot for all further implementations. The manner in which the chosen constraints are implemented affects the additional resources that may be consumed in executing the reference when rows in the dependent table are deleted or amended. This will be especially true of SET NULL or CASCADE implementations.

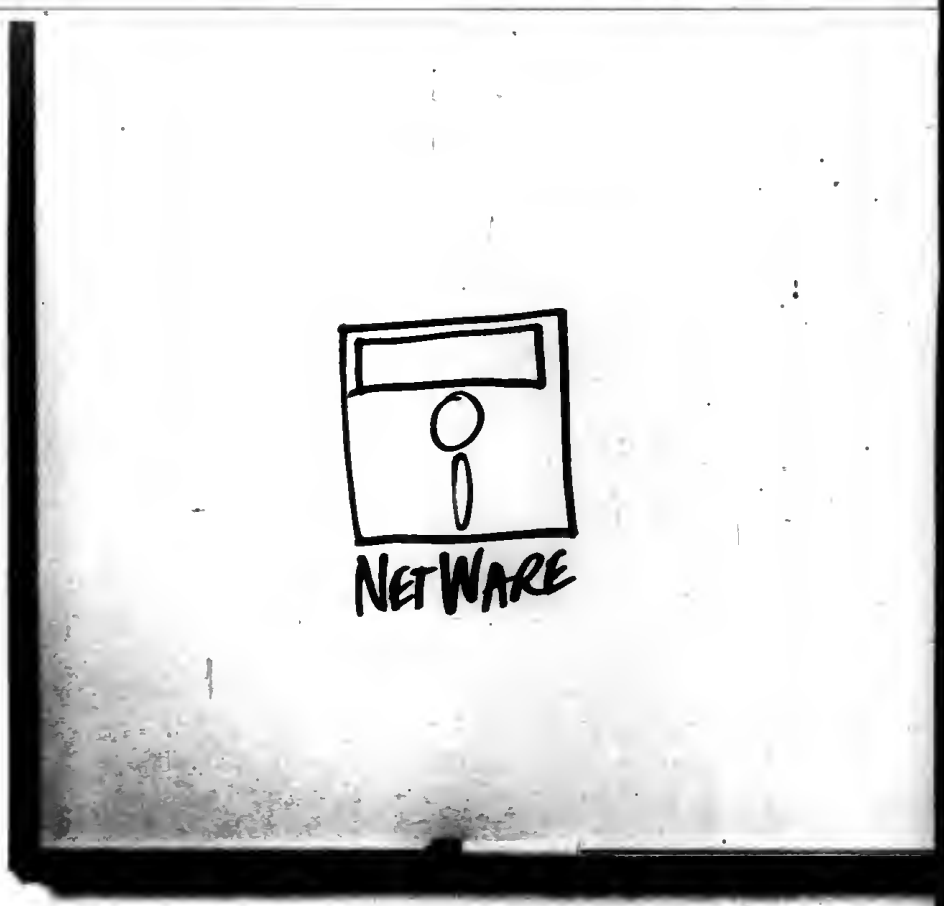
It is useful to measure resource consumption before and after implementing referential integrity to determine if anticipated benefits were achieved in actual conditions. Analyze where any significant discrepancies exist to refine the estimation process more fully.

However, referential integrity does provide advantages, so on those occasions in which performance gains are not realized, care should be taken to ensure that lower-than-expected results do not undermine further implementation.

Develop procedures to make certain that problems experienced during the trial implementation are documented and thus avoided in future implementations.

• Implement partially supported constraints. After implementing the referential constraints that did not change existing database designs, you can examine those constraints that are partially supported by existing indexes. Partial support means those references that have indexed lookups already in place, but not all references to a foreign key within the databases are examined in this way.

In partially supported restraints, the impact-estimation



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process differs in two ways. First, an assessment is needed of the effect of increased transaction times during the maintenance of tables requiring new indexes for those references that do not already have a suitable index. Second, the data in the table must be scanned if no indexes are to be added to the existing database design.

Again considering the figure on page 104, suppose an index was built on the customer order table that contained the following fields: order ID, order-date, customer ID and product ID. If the customer ID constraint described earlier was implemented, the deletion of a customer from the customer table would require scanning all the data in the customer order table.

This remains true unless the RESTRICT option was specified for the constraint, in which case the scan would terminate once the customer ID was deleted within the customer order table. If the needed index was constructed, there would be additional processing required within the DBMS when maintaining the customer order table data.

When indexes are not used for referential integrity constraint support while employing the CASCADE option, the potential exists for a rapid escalation in the number of locks acquired by an application program during a row deletion or amendment to the foreign key value. In this case, you should account for all core and direct-access storage device hardware resources required by the DBMS.

As before, list the benefits and proceed with the decision process, but realize that further changes to implementing referential constraints might require changes to the database design.

Remember, too, that new referential checks may be required in the application program and to search for additional errors during the data-maintenance functions. An increase in resources will also be required during the regular housekeeping of any table needing an update.

• **Avoid reference check duplication.** After implementing the partially supported constraints, be sure to review existing application code and remove duplicate referential tests.

There may still be some referential checks coded into the applications that were not obvious during the modeling process. For example, a customer code may have an embedded portion that indicates a location. This same location code may be included in a reference check elsewhere, but because the code is hidden by other data in the customer code, it may be overlooked and excluded when building the referential constraints.

The remedy in this instance is to rework the database design to separate the transient dependencies from the data. These dependencies may take the form of references against data from rows within the same table. Review the checks against the list of fields not fully denormalized to determine if they should be denormalized and included in the existing referential constraints.

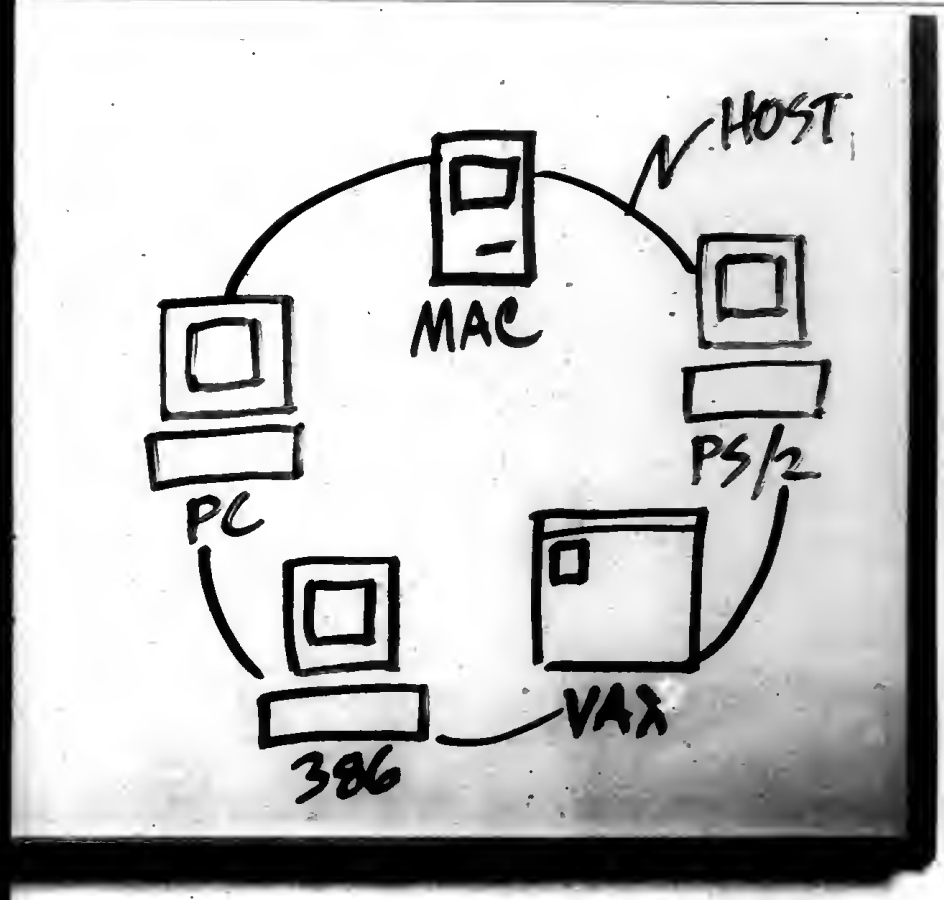
After having removed as many of the existing application- or end-user-coded referential checks as possible, you should study the requirements for desired referential constraints documented in the initial survey.

Worth the effort

When new applications are developed, the referential requirements must be gathered as part of the initial data analysis. While management, users and systems staff may question the merits of such lengthy initial analysis, it will result in an overall data architecture that better serves the needs of all users.

Those corporations that have yet to implement relational DBMS-based applications or end-user systems are encouraged to record all details of their data architecture and documentation processes in order to simplify a future implementation of referential constraints.

Those IS organizations that are now developing a relational DBMS-based system should also record the referential requirements in the data design of their systems. In this way, the eventual implementation of referential integrity in their DBMS software will require less development effort and will enable referential integrity's benefits to be fully realized. •



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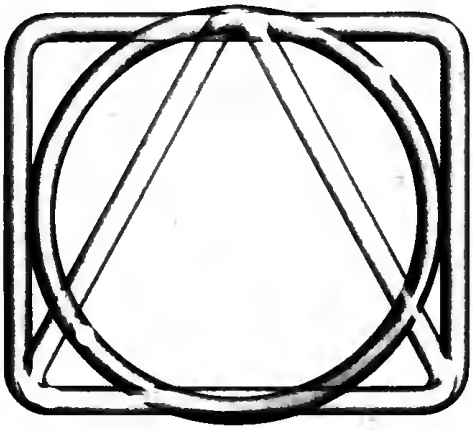

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INDUSTRY INSIGHT

Patricia Keefe

Prune the mumbo jumbo

From the sublime to the ridiculous, truth *is* stranger than fiction. It can be a lot dumber too. There are certain stock phrases or activities that most vendors should do well without. Pruning some of this deadwood might produce more meaningful marketing spiels that actually say something and catch user — never mind media — attention.

But first, this stuff has either got to go or get a little more real:

• **Sneaky price hikes.** I can certainly understand why you would want to be on the low-key side of a price increase, but users are going to find out somehow. The opposite of this has to be the chutzpah of Wordtech System's recent press release, which proudly announced plans to raise the price of DBXL "in honor of a major upgrade."

• **Quiet price cuts.** I've never

Continued on page 119

Inside

• Japan and the U.S. software industry. Page 114.
• A walk on the bright side of Wang. Page 117.

Walker hopes for DB2 fortune

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — Walker Interactive Systems is hoping to ride the coattails of IBM's DB2 relational database management product and exploit IBM's need to promote DB2 applications to increase revenue to critical mass for a public offering.

The 20-year-old company, which reorganized in the mid-1980s to move from a consulting business into financial applications, is just emerging from a traumatic period of change. In 1985, the firm shrunk from 282 people to 70 and closed many of its offices, having spent the better part of $21 million in venture capital with little to show for it.

It took two years to pay off its creditors at a rate of 36 cents on the dollar, but Walker never officially went under Chapter 11 bankruptcy protection [CW, Sept. 26, 1988]. Looking back at that breaking point is not easy, Walker Chief Executive Officer David Brownlee says today. Brownlee, who started Walker's international division in 1983, was called on to reverse the firm's fortunes in 1985.

"I didn't want us to be fifth in a market of 10," Brownlee recalled recently. "I decided in 1985 that DB2, which had just begun shipping at the time, would be our most significant investment. IBM was growing both the product and the customer base." Walker, with 350 customer sites, said that as many as 400 of IBM's large customers will migrate to DB2 each year.

Walker's Brownlee *aiming higher*

The DB2 strategy is a sound one, said Scott Smith, a vice-president at the New York firm of Donaldson, Lufkin & Jenrette, Inc. "I think they're headed in the right direction," Smith said. "They've got products that work, customers that are satisfied and a good management team."

Walker generates roughly $20 million in annual revenue, a company spokesman said. Yet Smith, like other consultants, said it is difficult to follow Walker closely, since it is privately held.

Latching onto DB2 is not the entire answer to Walker's

Continued on page 118

Scorecard: Big deals

One quarter into the game, 1989 looks like a fair bet to beat the 1988 computer company combination record: 446 reported deals, a 47% increase over 1987, with "megadeals" valued at $100 million and up, accounting for $7.45 of the $10.95 billion aggregate value. The top five megadeals in first-quarter '89 were the following:

• $398 million — EDS-Hitachi Ltd./National Advanced Systems, Inc.
• $250 million — AT&T/Paradyne Corp.
• Approximately $240 million — First Financial Management Corp./Georgia Federal Bank, FFB (Fuqua Industries).
• $175 million — Encore Computer Corp./Gould Computer Systems, Inc.
• $174 million — Ing. C. Olivetti & Co./ISC Systems Corp.

Second quarter's running start: Hewlett-Packard Co.'s $476.4 million Apollo Computer, Inc. buy.

Information supplied by The Cerberus Group

Sun radiates celestial third-quarter earnings

MOUNTAIN VIEW, Calif. — All eyes are on the workstation market, and the early sight of Sun Microsystems, Inc. is that of a company poised to meet the market-share challenge of the new Hewlett-Packard Co./Apollo Computer, Inc. combination in fighting trim.

Sun announced its fiscal third-quarter results last week, showing a 92% revenue surge and profits that more than doubled those of last year's comparable period.

Revenue for the quarter ended March 31 totaled $497.4 million. Net income of $31 million marked more than a 100% increase over the $14.3 million logged by Sun in its third quarter last year. Nine-month revenue of $1.33 billion boosted the company 94% over last year's corresponding period; net income for the first nine months of fiscal 1989 was $81 million.

Fourth-quarter figures, cautioned Chief Financial Officer Joseph Graziano, might not be as bright.

Limited availability of "certain new components needed to satisfy anticipated demand" for Sun's new products, Graziano noted, could leave pre-April 1989 products, with their somewhat lower profit margins, shouldering full revenue responsibility.

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Bull Peripherals

Japan

CONTINUED FROM PAGE 1

City, Calif., consulting firm. "But we have to pay some real serious attention to these folks."

Such warnings, which echo throughout the U.S. software industry, are generally being ignored. The complacency is understandable, considering Japan's track record in software.

In all aspects of software development and innovation, the U.S. currently holds a daunting lead. Adapso, the computer software and services industry association, estimates that the world software market, which was roughly $50 billion in 1988, will explode to $1 trillion by the year 2000. Today, the U.S. accounts for 52% of world software consumption and holds roughly 70% of the world market.

With that kind of dominance, there is little cause for worry, right? Wrong, according to the U.S. Congress, Adapso and a growing number of software industry experts and Japan watchers.

"There is definitely cause for concern," says Clyde V. Prestowitz Jr., a senior associate at the Carnegie Endowment for International Peace. "The Japanese have identified software as a weakness, and if past history is a guide, once they've identified a weakness, they spend whatever time and money is necessary to become a success."

With deep pockets filled with a strong yen, the Japanese are looking to the U.S. software industry as a potentially fertile ground for buying what they cannot develop quickly enough.

Several giant Japanese technology firms, with Fujitsu at the lead, have already established a software presence in the Silicon Valley. Fujitsu opened a development center in California in 1983 and hired U.S. software engineers. "I thought American people had a better idea of the product," Hirai says. Sony Microsystem Co. in Palo Alto, Hitachi America Ltd. in San Bruno and Ricoh Software Research Center in Santa Clara are already bringing Japanese software into this country and planning to begin software development in the U.S. in the next year.

THE JAPANESE are not fond of takeovers, feeling that a failure in such an endeavor is simply unacceptable.

Adapso is an concerned that it commissioned an extensive study entitled "Japanese Software: The Next Competitive Challenge" and in January issued the warning: "While the U.S. software industry currently enjoys a clear position of world leadership, Japan's recent dramatic successes in other information sectors suggest that its current efforts in software cannot be ignored by the U.S. industry or by U.S. government policymakers."

According to a report on international competition in services by the U.S. Office of Technology Assessment, "While European software firms have been more visible internationally than the Japanese, over the longer run Japan will emerge as the primary U.S. competitor in software."

Such warnings, however, evoke equally vociferous objections. Granted, the Japanese quietly snuck up on a cocky semiconductor industry during the past 15 years and then rushed past it into world dominance. Yes, they've made major inroads into the world's hardware market and supply nearly all the critical components that make up today's lucrative personal computer market. Ditto with printers, laptops, television sets, VCRs, cameras and automobiles. Why, with this track record, should software be any different?

MANUELLO PAGANELLI/WOODFIN CAMP

Prestowitz *worries about U.S. weakness*

A common answer

The answer for many people is that all of the products listed above are ones that can be copied, reduced to issues of process and manufacturing and bettered in incremental improvements, at which the Japanese excel. Software, on the other hand, is neither invented nor developed in such incremental fashion.

Software "is more an intellectual property and less of a product," says Cristina Morgan, an analyst at Hambrecht & Quist, Inc. in San Francisco.

"Japan's inability to produce software is deeply rooted in their culture," adds Nicholas Negroponte, director of MIT's Media Lab. Many of Japan's top computer firms are sponsors of the Media Lab, and Negroponte has close ties in Japan. "A transition won't happen without a major cultural change. What makes a good hacker is not education but a series of things that are all very un-Japanese. I don't see a major change in the near future," he says.

"Calisthenics at dawn doesn't fly in the software industry," adds David Tory, director of the Open Software Foundation. "There's a certain knee-jerk reaction that they will take over another part of the industry. Yes, they're good, but those attributes don't provide an advantage in the software industry."

Even those with a more cautious outlook agree that any Japanese inroads into software will be a minimum of five to 10 years away. There is, for example, a severe shortage of software engineers and programmers in Japan. According to the Adapso report, Japanese planners calculate that the nation will need 1.6 million software writers by 1990, but it will only have one million.

Despite this, there is little reason to doubt that the Japanese can tear down these barriers with a targeted effort. The major computer firms are responding strongly. Hitachi is spending 30% of its research and development budget on software, up from just 10% a few years ago. Toshiba Corp. established a "software factory" employing 3,000 programmers to work on products for business and industry. And NEC Corp. is spending in excess of $400 million annually on software development.

Alice Denson, manager of international affairs at Adapso, says, "The accepted view is that Japanese culture is not the proper culture to incubate a software industry. We take exception to that view. It's shortsighted. We've seen other industries get taken by surprise, and we don't want that to happen to software."

Steven Wright, vice-president of international operations for McCormack & Dodge Corp. in Natick, Mass., believes that the Japanese entry will be in three stages: hardware as the entry point; systems software, which in the long run will diverge from IBM; and, down the road, applications software.

The emergence of Unix may fuel the drive for application development. Sanyo, for instance, has nearly 100 engineering and graphics packages available for its Unix workstation.

However, language barriers and cultural differences present a critical obstacle in the area of applications development, and if U.S. software makers are complacent about any area, it is applications. "Because of the language problem, applications is not an area of concern," says John Imlay, chairman of Management Science America, Inc. in Atlanta.

"Almost all Japanese software is custom, written in-house," Wright says. "There are almost no packages." Indeed, the packages that are successful in Japan, such as its No. 2-selling Lotus Development Corp. 1-2-3, are virtually all American.

Groundswell of change

But there is a groundswell of change happening in Japan, some observers say. Hints of an embrace of individualism, the type needed for creative programming, are starting to pop up. "You'll find a lot of creativity in Japan if you look," says Jack Plimpton, head of Japan Entry, a Boxboro, Mass., consulting firm devoted to helping sell U.S. software in Japan. "With the PC being more accepted, you see more talented programmers going in that direction in Japan."

In fact, several innovative graphics-oriented software programs are generated in Japan, and the Japanese have established a dominant presence in entertainment software with the likes of superselling games such as Nintendo. Young entrepreneurs are also starting to emerge.

MITI leads, and Japan industry follows closely

In Japan, the powerful Ministry of International Trade and Industry (MITI) takes government intervention to a level unknown in U.S. industry. MITI orchestrated Japan's ascendancy in the various information technologies, and according to the Adapso report "Japanese Software: The Next Competitive Challenge," MITI's next major target is software.

Through liberal government funding and the active participation of industry, MITI is able to bring together forces that demand attention from the U.S. Though MITI's sponsored projects have born little or no fruit thus far, Japan watchers agree that it is unwise to ignore the efforts. "U.S. companies should look at all these projects very carefully," warned Clyde Prestowitz, author of "Trading Places: How We Allowed Japan to Take the Lead."

Here is a sampling of some of the many projects sponsored by MITI:

- **TRON:** The brainchild of a young Japanese researcher named Ken Sakamura, TRON (the Japanese term for Real-Time Operating Nucleus) is an attempt to develop a Japanese operating system based on a new standard microprocessor chip. According to Adapso's Alice Denson, TRON will allow independent software developers in Japan "more freedom and mobility." TRON is ambitious in that it will render the proprietary installed base in Japan obsolete. According to the Adapso report, MITI has already made TRON a factor by delaying the purchase of 700,000 personal computers to be used in the Japanese school system until TRON specifications are ready. While some see MITI as using TRON as a method to lessen Japanese dependence on U.S. software, the Japanese deny this and claim that TRON is open and available to any firm.
- **SIGMA:** Another MITI-industry joint project, Software Industrial Generation and Maintenance Aids (SIGMA), is a $200 million project designed to develop a network through which software production tools can be reliably used throughout the country. In addition, SIGMA is developing a database of software tools that will be accessible through the network.

According to Adapso, a dozen participating companies are already marketing SIGMA workstations, and about 40 experimental software tools have been rushed to market. U.S. reaction to SIGMA is mixed, and the feeling is that SIGMA workstations are simply competing with products sold by the sponsoring companies.

- **Fifth Generation Computer Project:** Started in 1982 by MITI and the leading Japanese computer makers, the Fifth Generation project was intended to develop a computer that would leapfrog current technology into the future using artificial intelligence, expert systems and natural language capabilities. The nine-year project, funded by MITI for approximately $740 million, has already paid off in the development of the Prolog software language. However, its goal, which caused a panic of activity in the U.S. in the early 1980s, seems unlikely to be achieved. Observers from the U.S. find little reason to believe that the Japanese will unveil an advanced, AI-based system that will make all computers obsolete within the near future, if ever.

GLENN RIFKIN

neurs like Kei Nishi — known as the Steve Jobs of Japan — at software companies such as Ascii are getting the attention of young, creative Japanese.

Peter Boot, vice-president of international operations at Ashton-Tate Corp., does not believe the perceived barriers will stop Japan from taking "a significant chunk" of the software market. "Conceptually, it's no more difficult to come up with the software than the hardware," Boot says. "Yes, they have a shortage of software architects, but a lot of day-to-day-type software is not that dramatic or hard to do."

Through the powerful combination of an organized, focused government/industry tandem, the Japanese are targeting software as the next high-tech frontier. Japanese business leaders are carefully scrutinizing opportunities in the U.S. for acquisition, joint venture or technology-siphoning in a heightened search for a stronger footing in the software world.

Nomura, Inc., Japan's and the world's largest brokerage company, recently commissioned a survey of 10,000 U.S. software companies through A. T. Kearney Technology. According to Garber, the principal objective of the survey was to identify U.S. software to import and distribute in Japan for 40 Japanese clients of Nomura. A secondary concern was to find a distribution channel for Japanese software in the U.S.

Japanese firms could establish market share by buying up U.S. software houses, but that is unlikely. To date, there have been no major acquisitions of a U.S. software firm by the Japanese despite their cache of cash and the takeover rage in the U.S. The Japanese are not fond of takeovers, feeling that a failure in such an endeavor is unacceptable. Also, as the OSF's Tory points out, the assets when buying a software firm are the creative people, and they can and do leave quickly if they do not like the management style.

There are a few instances of equity investments, however, and there are indications that more are likely to happen soon.

Investment option

Although Sony Corp. has been working on developing software relationships for less than a year, the company would also consider investing in U.S. software houses, according to Linda Keating, Sony's director of the third-party software program in Palo Alto, Calif.

Fujitsu has in mind joint marketing agreements, not acquisitions. Rumors abounded that Fujitsu was intent on acquiring Applied Data Research, Inc. just before Computer Associates International, Inc. took over the hunt. More whispers are now being heard about a possible Fujitsu-Cullinet Software, Inc. marriage, since Cullinet is in financial trouble and the two companies already have a marketing relationship in Japan. Both sides deny that such an arrangement is coming. Hitachi's Eric Waldman, head of U.S. marketing for the companies' computer-aided design and manufacturing package, says that his company will "eventually" have joint development agreements.

Coming ashore

Tom Chan, a Los Angeles-based lawyer and consultant who serves as middleman for deals between U.S. and Japanese firms, says the Japanese are "setting up a technology beachhead in California." Chan says it is not necessarily computer firms that are forging the ties; noncomputer makers such as securities firms, automakers and steel manufacturers are getting into the act as well.

Bernard Goldstein, a partner at Broadview Associates in Fort Lee, N.J., says the Japanese will enter this market through smaller investments of $5 million to $15 million rather than giant deals.

Chan agrees, pointing to a changing venture-capital scene in which big U.S. companies are less willing to invest in software start-ups without grabbing total control. "Small companies don't want that, so they go to Japan for money," Chan says. "Unless the U.S. government gives incentives to big companies to invest in these start-ups, you'll see more and more look to Japan."

The cultural barriers, perhaps more than any other issue, make such connections difficult. Garber relates how shocking it was to observe teams of Japanese interviewers from Nomura speaking with principals of U.S. software firms, following the release of the Nomura report.

"They simply couldn't understand these firms," Garber recalls. "These are small companies, and they don't want to be big companies. The role model in Japan is General Electric — grow and get bigger. They had trouble understanding the care and feeding of programmers and the style-of-life issues."

In Japan, if a firm needs a programmer, it will recruit an existing employee and train him specifically for the job, according to Fujitsu's Hirai. "In the U.S., you can hire an engineer, but you have the risk that he or she will leave the company," he says. After two years working with U.S. software engineers, Hirai says he still does not understand them: "I am disappointed with their discipline."

Though the hurdles are numerous, there is little reason to doubt Japan's tenacity in going after markets it desires. The question facing the U.S. software industry and the U.S. government is whether the situation requires a unified response. Tom Howell, an attorney at Dewey, Ballantine, Bushby, Palmer & Wood and the author of the Adapso report, says that the U.S. software industry is now where the semiconductor industry was in 1977.

"The Commerce Department sends researchers to Japan periodically for two months to study the high-tech developments there," Howell says. "It's startling. We were surprised that they were actually ahead of us in certain software development areas already. They've failed up to now in software, but we should keep informed and stay somewhere between complacency and panic. It's a good idea never to brush them aside." ■

MANUELLO INGANELLI/WOODFIN CAMP

Adapso's Denson *advocates wary attitude toward Japan*

When corporate cultures collide

Despite concerns about a cash-rich Japan buying its way into the U.S. software industry, there has been little overt acquisition by the Japanese thus far. Perhaps the CSK-Foothill Research example explains why.

Foothill Research in Belmont, Calif., was an insecure start-up seeking financial help from a large investor in 1986. The firm wanted to produce a fourth-generation language (4GL) called Style, but it could not find a U.S. company willing to invest the several million dollars needed.

Along came the CSK Group, the largest software and services company in Japan with revenue of $1 billion. CSK wanted to establish a foothold in Silicon Valley, and it also needed a 4GL for its portfolio. But it did not want to wait for its own developers to create such a program.

CSK bought in and became the majority owner of Foothill. David Parks, president of Foothill, says the cultural and philosophical differences began to surface quickly. "Working with Japanese companies, there is a lot of inertia," he says. "They take a long time to decide to do something, and then once they decide, it becomes an indestructible decision." In the software world, where change is bullet-paced, such thinking is suicidal.

Some misunderstanding

It was also clear that neither side truly understood the business direction each believed in for Foothill. CSK simply was not interested in Foothill as a firm — its potential, its growth. The Japanese simply wanted the product, said a Foothill executive.

Akira Yamamoto, a CSK manager, says there was a gap in the desired goals of each company. Foothill wanted to get into banking applications, while CSK wanted the U.S. company to focus its attention on porting Style to the IBM environment, Yamamoto says.

Yamamoto denies there is any cultural problem between the two companies. He claims that both companies clearly understood each other but did not agree on the business direction.

Parks says he admires the Japanese style of management in its attention to detail, insistence on quality and stability and its steadfastness toward its goal — "qualities all too often secondary in the U.S." But these qualities, when foisted on a young software company, quickly become a lead weight. In software, according to Parks, you do not have the luxury of such foot-dragging.

The inability to change direction quickly cost Foothill some key developers, and in the long run, the culture shock proved too great. CSK and Foothill are in the process of dissolving their three-year marriage.

Yamamoto points out that CSK is determined to become a $10 billion company and will reinvest in the U.S. sometime this year. For Foothill, the move is risky. The young company needs investment help badly. But working with the Japanese simply caused too many problems.

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Imported goods

Japanese-produced software is not likely to be found on the shelves of your local retailer. Of the few offerings on the market, none are mass-marketed and most are related to graphics or engineering, where language and cultural differences are not a major factor.

The following are the major packages offered by Japanese companies:

• **Fujitsu America, Inc.** The American-built Elm (Engineering Library for Modeling) family of software includes Elm Prelude for an interactive graphics approach to inputting structural data for analysis; Elm Analysis for static, modal and response spectra; and Elm Epilog, a graphics postprocessor for review and report generation.

• **Hitachi America Ltd.** Hitachi sells two lines of software, both developed in Japan. The Hibio line is for researchers to use in studying human DNA. Hibio DNAsis software is for analysis of DNA sequences; Hibio Prosis, for the analysis of protein sequences; a DNA film scanner for DNA base pairs; and CD-Gene, a compact disk/read-only memory database. For the computer-aided design and manufacturing market, Hitachi offers Hicad for design and mapping.

• **Ricoh Corp.** Ricoh markets a database management system, an engineering design package and a file library system. Graphbase, Ricoh's database management system for Unix workstations, employs real and virtual links to organize information. G-ISAM is a file library for application programming in MS-DOS and Unix C environments. Designbase is a three-dimensional solid modeling system intended for industrial design for Unix workstations. All of the Ricoh packages were developed in Japan.

J. A. SAVAGE

Sony rethinks software future

Design center seeks solutions two generations beyond Unix

BY LORI VALIGRA
IDG NEWS SERVICE

TOKYO — A well-stocked refrigerator, plenty of time to think and working environs like home are familiar to U.S. programmers but heresy in Japan, where blue suits, white shirts and dawn-to-dusk workdays are the rule.

But the workaholic salary-man stereotype is slowly changing here as government and industry scramble to repair a traditional weakness: software development.

Sony Corp., in sticking to its maverick image, set up Sony Computer Science Laboratory, Inc. here, a design center created in April 1988 in the image of U.S. software houses that aims to develop software two generations beyond Unix.

Unlike most software development, which is tied to hard product results, the lab functions independently from regular company business, explained Kei Kiyasu, a spokesman for the center. "The purpose of the lab is to develop future operating systems and man-machine interfaces," he said. Areas of research include distributed operating systems, programming languages, system architectures and user interfaces.

"Our aim is to provide an ideal research environment in which upper-echelon scientists from around the world can work with pride and enthusiasm to achieve breakthroughs of universal value," wrote Toshi Doi, president of the operation, about the lab's mission.

Doi searches for scientists around the world, pulling them in from the engineering ranks of companies and universities. To date, the lab has hired two foreign workers, both from the U.S.

Workers at the lab are expected to set their own goals within basic research themes. Each of the seven researchers and two lab managers has his own office, and all are evaluated and paid for achievements such as technical papers and software research.

There have been no completed projects in the lab's one-year history; however, once programs are developed, the lab wants to put them in the public domain worldwide.

The lab is uncharacteristic for a Japanese organization: Researchers' salaries depend on performance rather than on age and experience, which is the traditional standard in Japan.

Lab workers are on an equal status level, with no signs on their doors indicating titles or seniority.

"Each is doing their own research, like a university grant," Kiyasu says. The average lab worker is 30 to 35 years old.

Talk block

Software developers on both sides of the Pacific have made little progress in applying technology to the burdensome language barrier between Japanese and English. Currently, there are no Japanese-to-English translation packages commercially available in the U.S.

However, at least one translation package is sold in Japan. Fujitsu Ltd. claims that its workstation-based software is nearly twice as fast as human translation — 4,000 words per hour. However, the translated document looks more like instructions for assembling a stereo than anything written by William Faulkner, even if the original document is a piece of literature.

"The English is like Japanese speak English," says Katsuhide Hirai, director of the information systems division at Fujitsu America, Inc. "The translation is dependent on a dictionary that is being developed in Japan."

NEC Corp. is said to be developing a similar system to run on minicomputers, but details were not available.

Voice interpretation technology was showcased in Japan last month by Matsushita Electric Industrial Co. in cooperation with Carnegie-Mellon University. According to Matsushita, its system can convert conversational Japanese into English in about five seconds on a 32-bit workstation. The output can be either text or synthesized voice.

A computerized translation service, but not a software product, will be marketed by Systran Translation Systems, Inc. in La Jolla, Calif. The company, however, cannot pin down a date for availability. Systran primarily translates Russian and European languages and has developed a Japanese-to-English translator system. It will be made commercially available when it achieves better than its current 75% accuracy, said Alan Portela, vice-president of marketing.

Systran users subscribe to the service on a monthly basis.

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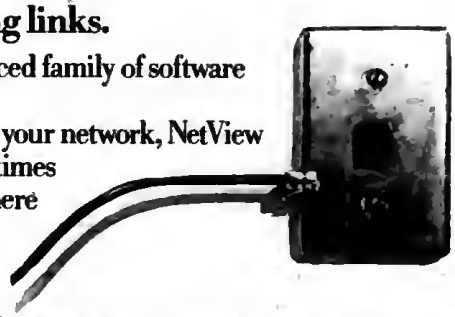

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Users loyal despite Wang's fiscal woes

BY PATRICIA KEEFE
CW STAFF

Heavy discounting and perilously high overhead have cost Wang Laboratories, Inc. some intangibles that in the long run could hurt a lot more than its recent $64 million quarterly loss. Wall Street is fed up, and there are signs that nervous customers are edging toward the door.

Yet even as Wang's fiscal woes threaten to be the last straw for some users, still others remain steadfast in their defense of the vendor. Saving graces for the foundering Lowell, Mass., mini maker are its products and its many innovations, according to users. Those interviewed during the last two weeks may not all salute Wang's plan to refocus its energies on pushing imaging technology into specific vertical markets, but there is no question that they like Wang technology.

Wang booster

Clement Kichuk, MIS director at Westport, Conn.-based Marketing Corporation of America (MCA), liked Wang so much that when his company spun off an outside consultancy and tapped him to head up that venture alongside his internal MIS duties, he found himself recommending Wang more often than not to paying clients.

Kichuk has stayed with Wang primarily because its proprietary Pace relational database provides a platform on which he said he can develop customized software very quickly. "There is such a tremendous difference in the amount of syntax that you have to grapple with in the Wang environment; it's designed to do away with programmers," he said.

Today, Wang is still used internally at MCA and has managed to grab about 75% to 80% of its Marketcorp Systems division's business, Kichuk said.

At a Fortune 100 chemical company, Wang is considered "very strategic," according to its MIS director. Many of his firm's worldwide companies are committed to Wang as well, he said, crediting Wang with staying ahead of the competition in many areas technologically. "I'm not worried about the company's ability to service, produce hardware or survive over the next five years," the executive concluded.

> "I'M INVOLVED heavily with Wang user groups, and I don't see anyone changing Wang gear because of this loss."
>
> MARWAN L. DAOUD
> CONSULTANT AND
> SOFTWARE DEVELOPER

Marwan L. Daoud, a consultant and software developer in Chicago, agreed. "I'm involved heavily with Wang user groups, and I don't see anyone changing Wang gear because of this loss," Daoud said.

Instead, he said, Wang users are focused on making certain that their own needs — better service and up-to-snuff product releases — are communicated to Wang and that the firm responds.

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DEC suits up against firm for Round 2

MAYNARD, Mass. — Digital Equipment Corp. has filed suit against System Industries, Inc. in U.S. District Court in Boston, charging the Milpitas, Calif., vendor of DEC-based data storage subsystems with four counts of patent infringement.

This marks the second time that DEC has seen System Industries' DEC-compatible products as too close for comfort and decided to make a federal case out of it.

The first patent infringement suit against System Industries by DEC, brought in 1980 over three bus products, was settled in 1987. In the current action, DEC is asking for a permanent injunction against sales of several System Industries products, including the so-called C series storage subsystems, as well as triple damages for what DEC has characterized as "willful infringement of Digital's patent rights."

In a prepared statement, DEC referred to the lawsuit as a demonstration of its "longstanding policy and commitment to vigorously protect innovations resulting from investments in research and development."

A spokesman for System Industries noted that the C series product has been shipping since July 1986.

According to Larry Tashbook, vice-president at System Industries, product management and planning, his organization's reaction "will be fast and vigorous."

Walker

CONTINUED FROM PAGE 113

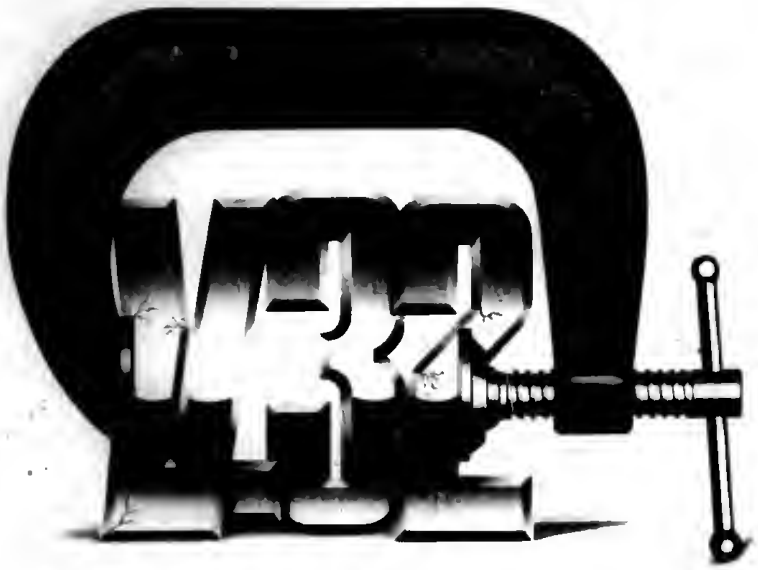
growth plans. There are several DB2-related products in the marketplace, including DB2 utilities and add-ons that IBM does not provide. Walker's strategy has been to furnish finished applications that can be plugged into a user's IBM IMS database, for example, and then be moved into a DB2 environment in a minimum amount of time. IBM has indicated that it expects most customers to continue using IMS for five years or more as their primary transaction-oriented database [CW, April 24].

Designers at IBM's Santa Teresa, Calif., software laboratory remain skeptical of vendor claims that DB2 migration can be done quickly. Yet Walker claims that, by insulating Walker application code from the underlying IMS environment, users can move to DB2-based Walker applications in days instead of months.

"We've had customers who've migrated all their data files in one weekend," maintains David Fisher, Walker's vice-president of marketing. "The customer can use our applications under Cullinet's IDMS, for example, and migrate to DB2 at the time he decides."

Walker's Strategic Software line is positioned to cope with eventual DB2 migration, according to Brownlee, because Walker has "layered" its IMS applications, thereby breaking them up into functional modules. "We think DB2 is coming of age about three times faster than IMS, which wasn't fully accepted in the marketplace for nine years," Brownlee said. "DB2 is going into production at many large sites, and it's only been out for three years."

For the last three years — coincidence or not — Walker has shown a profit every quarter, and better times may be ahead. On the strength of Walker's new DB2 strategy, investors raised $12.5 million in new capital last year, Brownlee said. The privately held company may go public sometime next year, and there is even the possibility of an acquisition or two, Brownlee hinted, if Walker finds a small software firm that has "a good fit" with its business.



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IN BRIEF

High hopes

Computer Sciences Corp. is increasing its Belgian stronghold in anticipation of Europe 1992. The El Segundo, Calif.-based company will acquire major Belgian computer services player CIG-Intersys Group and its subsidiaries from Societe Generale de Belgique S.A. and Generale de Banque S.A.

High cost

Charges incurred in the $140 million acquisition of **Gould, Inc.'s** computer business will throw **Encore Computer Corp.** into the red in its first and possibly second quarter, according to an Encore spokesman.

High figure

Kenosuke Matsushita, founder of Japanese electronics giant **Matsushita Electric Industrial Co.**, died late last month at the age of 94, leaving an estate estimated in the neighborhood of $1.5 billion — a reported record-breaker in Japan.

Higher and higher

NCR Corp. has promoted its **NCR Comten** subsidiary to the forefront of NCR's corporatewide networking strategic development effort. As part of Comten's official designation as director of networking architecture, NCR's South Carolina-based systems engineering department will now report to Comten President A. Daniel Piggott.

PS/2-clone rumor

IBM compatibles maker **Wyse Technology's** recent agreement to pay IBM royalties on all present and future Wyse offerings that use IBM technology sparked rumors of Wyse plans for a Personal System/2 clone. Not so — at least, not soon, a Wyse spokeswoman said.

Alliant allied

Minisupercomputer maker Alliant Computer Systems Corp. and Informix Software, Inc., relational database provider to the Unix world, have joined forces to place a relational database on Alliant's parallel processing platform by the end of the current quarter.

It's an ill wind . . .

Generation 5 Technology, Inc., which launched one of the last initial public offerings before the stock market crash of 1987, is once again making the best of history. The Denver-based company's computer mapping system was tagged by the Alaskan Department of Environmental Conservation to map the *Exxon Valdez* oil spill.

Keefe

CONTINUED FROM PAGE 113

understood IBM's propensity for invisible price cuts. You'd think they would want to shout it from the rooftops. Instead, it's handled like a private sale. They whisper it in the fine print way back on page 246 of the latest wave of Ivories or alert a few select users via Customer Letters.

• **Euphemisms for layoffs, cutbacks and product retirements.** You can run, but you can't hide. Customers have a right to know if these events are occurring and how they may be affected. They don't appreciate being confused or misled by doublespeak or fancy footwork. IBM's mishandling of the demise of the PCjr is classic. The firm has never officially admitted the product was killed (what would you call it?).

• **We're user-driven.** So why do so many vendors foot-drag, give lip service to or otherwise talk snidely about technologies their users demand? Where did all these proprietary systems come from? When will we see DEC and IBM systems embrace each other? How come standards activities are so steeped in vendor politics? Will service and support ever move off the back burner? I could go on, but I think you get the picture.

• **IBM or DEC will legitimize the market.** Oh, please. The lips are smiling, but the knees are knocking. Only an idiot believes that any *small* vendor will consider the presence of a very *large* vendor on its turf to be a gift from God. Besides, IBM likes to wait for other firms to legitimize a market. Then its marketing team moves in with a steamroller.

• **Our goal is to expand the market.** As opposed to what? Shrinking it?

• **Our goal is to seek market leadership.** Now here's s novel idea. It's surely the last thing to be expected from any vendor seeking wealth and fame. But I guess it's important to differentiate from those who aspire only to be followers.

• **We have no competitors.** Really? Then you're either to be congratulated for your courage in being on the bleeding edge (just ask Ungermann-Bass about its token-bus subsidiary), or you'd better take the blinders off before your revenues trip and fall — flat on the bottom line.

• **Strategic alliances and open minds.** If I didn't know better, I'd swear that the connectivity enclave was the most open, not to mention supportive, in the computer industry. All this verbalizing about teamwork, is of course, customer-driven (no doubt at the point of s checkbook). It'a too bad that most of these potentially useful alliances don't accomplish much beyond wasting a few more trees.

• **New dimensions in vaporware.** Just when you figured it was safe to allot vendors the right to provide statements of direction and give 'em a year to deliver, along come Microsoft and Digital Communications Associates with the fusion theory of vaporware. Their OS/2-to-IBM host server was announced a year ago, reannounced last week, and it'a not supposed to ship until the fourth quarter, which could mean delivery as late as December! That's a 20-month lead time — a deadline to kill for and one some users just won't wait around for.

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*Keefe is s **Computerworld** senior editor, networking.*

NICKELS & DIMES

Augat, Inc. announced revenue for the first quarter ended March 31 of $80.4 million, compared with $80 million in the previous year. Profits were $3 million, compared with $2.1 million reported in the first quarter of last year.

Ask Computer Systems, Inc. reported revenue for the third quarter ended March 31 of $46.7 million, compared with $37 million a year ago. Profits were $3.2 million, compared with $2.6 million in the previous year.

Storage Technology Corp. announced income for the first quarter ended March 31 of $14.4 million on revenue of $210.6 million. Net income for the first quarter of last year was $10.6 million on revenue of $196.4 million.

Intergraph Corp. announced revenue for the first quarter ended March 31 of $185.7 million, compared with $174.7 million last year. Profits were $19.5 million, compared with $17.1 million a year ago.

Tandy Corp. reported revenue for the third quarter ended March 31 of $943.7 million, compared with $839.1 million during the previous year. Profits moved ahead to $66.7 million, compared with $64.1 million reported in the like period s year ago.

Harris Corp. reported that net income in the third quarter ended March 31 increased 25% to $27.6 million, compared with $22.1 million the previous year. Revenue climbed 11% to $581.7 million, compared with $524.7 million one year ago.

Mentor Graphics Corp. announced revenue for the first quarter ended March 31 of $90.5 million, a 34% increase over the $67.6 million reported for the like quarter last year. Profits were $10.4 million, a 52% increase over the $6.9 million reported a year ago.

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The way to the executive suite

A leading placement professional relates his view of the path

BY HERB HALBRECHT
SPECIAL TO CW

During my 30 years in executive search as an information services specialist, I have been asked countless times for advice on how to prepare for and manage a career in information services.

Many questions concern education. For someone wishing to advance in information services management, education should include several elements:

First, there should be some liberal arts education. History, psychology and economics in particular provide a perspective on the world. Such a grounding helps the information services executive relate to managers in other areas of the company.

Second, there should be some study of computers but primarily to gain an understanding of their uses and limits, not necessarily the nuts and bolts.

Third, any effective executive must have some training in business management, most particularly a keen awareness of how a company actually makes its money.

Finally, your education should foster an understanding of how to manage rapidly changing technology. In terms of a specific field, engineering most encompasses the aspects I've mentioned. Seeing how things fit and relate to each other is key to engineering.

On the graduate level, consider a course of study that focuses on the management of technology, an increasingly crucial challenge to U.S. business.

Pushing ahead

One's education should not end with a bachelor's or master's degree. Early in a career, continue taking courses that are related to technology, business or a related field. This cannot be emphasized enough.

A successful career depends on the individual and whether he fosters some career opportunism. For example, after college or graduate school, when you have established an entry-level position in information services, try to make a lateral move into one of the functional areas of the organization, such as sales and marketing, manufacturing, finance or distribution. Learn how the organization makes money and how it maintains a competitive position.

Conversely, don't allow yourself to become involved too long or too deeply in technology. It can become a trap and an obstacle to advancement.

Become an astute businessperson, and then move back to the information services function. After earning your spurs in a management capacity, you will understand how information and technology can help to leverage a business operation to gain a crucial competitive advantage.

Two examples come to mind: Fred Gluck, managing director of McKinsey & Co., and Herman Cain, president of Godfather's Pizza.

Gluck, with a strong technological background, rose to head one of the nation's largest consulting firms because of his ability to break down and understand business problems; he is a brilliant strategist who understands people.

Cain built a successful information services career, beginning in operations research at Coca Cola Co.. He became vice-president of MIS at Pillsbury Co. and moved beyond the role of "computer jock" in serving as regional manager at Burger King before becoming president of Godfather.

Another common question has to do with changing jobs. There are few rules, but one is that you must definitely seek a new position if senior management is not receptive to utilizing information services technology for strategic advantage. In fact, to stay in such a situation could destroy your career.

Jumping ship

Can you change positions too often? Someone just out of school might jump jobs in fairly rapid succession. What the search consultant will look for on a resume are jobs of longer duration as a career progresses. A bad sign would be jobs of shorter and shorter duration.

Frankly, when I see someone's a resume who has had, for instance, four jobs in five years, it becomes difficult to evaluate the person's capabilities or track record. This would be a particular problem at higher levels. With no track record to examine, a search consultant or prospective employer would have to rely on intuition, judgment and prayer when making a hiring decision.

> DON'T ALLOW YOURSELF to become involved too long or too deeply in technology. It can become a trap and an obstacle to advancement.

Another key to advancement is to play some role in senior-level strategic planning. This could be done on either the corporate or consulting side. Three of today's most prominent corporate chief information officers earned their reputations as consultants. Joseph Baumholz moved from Booz, Allen & Hamilton, Inc. to become CIO at Chemical Bank and was recently promoted to chief financial officer. Patricia Barron went from McKinsey to Xerox Corp. Bruce Harreld moved from the Boston Consulting Group to Kraft, Inc., where he now serves as senior vice-president and CIO.

I predict that perhaps half of all future CIOs will not be, by training or orientation, information technicians. Instead, they will be broadly based, business-oriented managers who are "snow proof." They will have a passion for and an understanding of how to manage technology.

As a search consultant who has specialized in information services for more than a quarter of a century, I can say this with authority: Only those information services managers who identify with their company's business goals as a whole will make it into senior management. Only those who are sincere about achieving the company's goals, not just their own, will succeed there.

Halbrecht is president of Halbrecht Associates, Inc., a Stamford, Conn., executive search firm specializing in high-technology areas.

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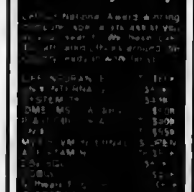

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a national leader in the personal communications industry, has an outstanding opportunity for a highly qualified and motivated individual to participate in the expansion of our nationwide paging billing operation. The position requires an oriented System Analyst with a proven minimum 5 year track record to lead development projects. A design background in DLTR systems required. VAX/VMS ACMS preferred. For prompt consideration, please send resume and salary requirements to:

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MIS Department
600 108th Avenue N.E.
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CONSULTANTS AND PROGRAMMERS

Staffware, HOUSTON'S premier data processing consulting firm, has a solid clientele of Fortune 500 companies. HOUSTON'S strong economic recovery has created immediate top-paying opportunities for professionals with two or more years experience in the following areas.

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- FOCUS
- DB/2, SQL
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Contact or send resume to:

STAFFWARE
1111 North Loop West
Suite 810
Houston, TX 77008

Phone: 713-880-8838 FAX: 713-880-8836

SYSTEMS ANALYST - Partake in development on new dBased software products. Require Bachelor's in Management Information Systems or related and 1 year experience including structured design and development, object oriented design and dBase II/III/III+ and FRAMEWORK. Salary: $32,280 per annum. Job location: Torrance, CA. Resume to: CW-85164, Computerworld, Box 9171, Framingham, MA 01701-9171.

Programmer and Database Professional Opportunities

The Huntington is a $9 8 billion regional bank headquartered in Columbus, Ohio's capital city Columbus is a vibrant, growing city and the Huntington is a vital part of this growth.

The Huntington Information Systems and Services Division is an integral part of Huntington Banks, and is housed in our new, three story data center located in the northern suburbs of Columbus. Our operating environment includes an IBM 3090 MVS/ESA architecture utilizing DB2, CICS, VSAM and IEF (a CASE technology tool set).

Professional opportunities now available include:

DB2 Systems Programmer

Must have two or more years' experience using the DB2 database in an online system with a CICS or IMS attachment. Must be experienced in installing the DB2 product and have internal knowledge of DB2. Experience with CICS system programming is a plus. Five or more years of total data processing experience is required.

Systems Programmer

Responsible for the performance and capacity planning function of our 3090 system. Specific duties include: installation and implementation of the MICS reporting system; effective utilization of Boole and Babbage performance monitors; establishment of tuning parameters for our MVS/ESA operating system, collecting and reporting capacity planning information, and recommending hardware upgrades as necessary. Previous experience installing and using these tools in a large IBM installation is required.

Database (DB2) Analyst

Maintain the physical database definitions; support DBMS utility usage, provide physical database design, generate test database environment; support our program development; evaluate data access alternatives. A total of five years of IS experience, with at least two years of DB2/DBA experience is desired.

Senior Programmer Analyst

Will work on large scale projects utilizing design skills for both online and batch systems; extensive involvement with users and IS staff members. Five or more years of on-the-job programming experience required as is experience working with CICS command level; strong interpersonal and analytical skills and a Bachelor's degree in CIS, MIS, or systems desired. IBM 4700 experience and PC development a plus.

The Huntington offers an attractive relocation package, excellent starting salary and a comprehensive benefits package which includes medical and dental insurance, paid life insurance, tuition reimbursement, stock plan and discount rates on many bank services. The Huntington maintains a smoke-free environment.

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Jim Kraynak, OP44
The Huntington National Bank
2361 Morse Road
Columbus, Ohio 43229

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Huntington Banks

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National Advanced Systems is now a wholly-owned subsidiary of Hitachi Data Systems Corporation, a joint venture of Hitachi, Ltd., and Electronic Data Systems (EDS). NAS has always been a leader in technology, reliability and customer satisfaction. Now, these new world-class partners reinforce our determination and ability to be the premiere supplier of IBM compatible mainframes and storage systems.

Our resources and resolve are more powerful than ever. Our strategic alliances are stronger than ever. And our worldwide customer base continues to steadily grow.

Take a look at the following opportunities. Join a company with a proud tradition of achievement... and an exciting future of world-class success.

Systems Engineers

Provide technical expertise for Marketing Support activities, working closely with prospects and customers. Duties include performing technical studies, planning hardware/software configurations and giving formal product presentations. To qualify you should have a minimum of 5-7 years' experience as a Systems Programmer or Systems Engineer in an IBM 308X, 3090 or large-scale IBM compatible environment. Strong oral and written communication skills are required. We prefer a BS degree in a related field and externals/internals knowledge of one or more of the following: MVS/XA, VM, VM/XA and applicable subsystems. Capacity planning and performance tuning a plus. Opportunities are available in: Chicago, Cincinnati, Dallas, Detroit, and St. Louis

Customer Service Account Representatives

Provide technical expertise for Customer Support activities. Duties include problem determination, technical coordination between our customers and NAS' hardware/software personnel, plus installation and configuration planning. Qualifications include 5-7 years' experience as a Systems Programmer, Systems Engineer or Manager of Technical Support, and in-depth knowledge of MVS/XA externals and associated program products. Strong skills in problem determination and diagnostic procedures are essential. Additional expertise in VM/XA, IMS, CICS or telecommunications a plus. Must possess good communications skills and be willing to learn hardware diagnostic and repair techniques. High school diploma required. College degree a plus. These positions are available in: Cincinnati, Dallas, Indianapolis, Omaha and St. Louis.

Marketing Representatives

Develop strategies and contact prospective customers, while servicing established accounts. NAS will back your endeavors with a highly integrated network of customer service and support personnel, as well as a flexible marketing system which will allow you to be responsive to your customers' needs. Ideal candidates will have 4+ years' sales experience which relates to the IBM compatible environment. You must be an energetic and motivated individual who enjoys independence and teamwork. Opportunities are available in: Chicago, Cincinnati, Cleveland, Columbus, Detroit, Houston, and St. Louis.

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For immediate consideration, send your resume, indicating the position and area of interest, to: National Advanced Systems, Dept. CW58, 500 Park Blvd., Suite 1200, Itasca, IL 60143. We are an equal opportunity employer. Principals only, please.

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Large nat'l consulting firm seeks individuals w/solid exp in DB2, IMS DB/DC, IMS DB/DC-COBOL and/or PL/I, COBOL/CICS, MSA/COBOL, Adabas/Natural and DB2/TELON

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Client located between Hou & SA has urgent need for P/A. Ideal country setting for someone w/18 M36 RPG III & Ins. Relocation paid.

INTERGRAPH PROGRAMMERS:
Local engr firm has several openings for candidates w/Intergraph & FORTRAN prog skills. VAX/VMS oper exp a must! Unix and/or CAD a plus To $40,000

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DBMS APPL MGR:
Major O&G co seeks indiv w/ 5+ yrs exp w/DBMS appl IBM mainframe exp a must along w/O&G bkgd. Will work extensively with DBMS tech & appl regarding selection & utilization of data base structures.

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PROGRAMMER/ ANALYST

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Ideal candidate should have a minimum 2 years experience on IBM System 38, RPGIII and a strong comprehensive background in a life/health environment.

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An excellent opportunity is available at our multi-facility health care corporation. The Programming Manager is responsible for the planning, design, development, programming, implementation, documentation, control and follow-up of system software applications for the corporation. Requirements include 5 years computer application development experience, preferably in the hospital environment, thorough mainframe skills and PC experience, Bachelor degree in management or related experience, supervisory experience preferred.

Excellent compensation is offered. To apply send your resume to Recruiting Operations:

Michigan Health Care Corporation
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SYSTEMS ENGINEER - Will design software systems using Cortex Application Factory (4th generation language with UNIX, RDB (Relational Database) on VAX/VMS and micro-VAX operating systems based on client input. Develop software application to automate client goals. Salary $25,000 per year. Basic 40 hour week (8:00 am - 5:00 pm). Requirements: four years college with a Bachelor of Science Degree in Information Systems, time course in database management systems; one course in software engineering management - coursework must also have included use of VAX/VMS operating systems; nine months experience in related occupation as Systems Analyst. Send resume: MESC, 7310 Woodward Ave., Room 415 (Reference No 7389) Detroit, MI 48202. Employer-paid ad.

CONTRACT POSITIONS

2 Years Minimum Programming Experience

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ORACLE - COBOL - C
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For more information, or to place your ad regionally or nationally, call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700).

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All the information you need is right here. Just call Lisa McGrath at 800-343-6474 (in MA, 508-879-0700). Or, if you want, you can send us the form below via mail or to our FAX machine You can reach our FAX at ext 739 or 740 at either of the above numbers.

The following information will help you determine the size ad you'd like to run and when you'd like to run it.

CLOSING DATES: To reserve space, you need to call us by 5PM (all continental U.S. time zones), 6 days prior to the Monday issue date. We need your ad materials (camera-ready mechanical or copy for pub-set ad) by 5PM, 5 days prior to the weekly issue.

AD COPY: We'll typeset your ad at no extra charge. You can give us copy via phone, U.S. mail, or FAX. To typeset an ad for you, we need clean, typewritten copy. Figure about 30 words to the column inch, not including headlines. (There are seven columns on each page.)

LOGOS AND SPECIAL ARTWORK: Any logos or special artwork should be enclosed with your ad copy. For best reproduction, please send us either a stat of your logo or a clean sample on white bond paper.

COLUMN WIDTHS AND MINIMUM DEPTHS: Your ad can be one of seven different widths. There is a minimum depth requirement for each width. You can also run larger ads in half-inch increments. The chart below can serve as a reference.

NUMBER OF COLUMNS	WIDTH	MINIMUM DEPTH
1 column	1-1/4"	2"
2 columns	2-5/8"	2"
3 columns	4-1/16"	3"
4 columns	5-9/16"	4"
5 columns	6-15/16"	5"
6 columns	8-3/8"	6"
7 columns	9-3/4"	7"

RATES: Your rate will depend on the size of your ad and whether you choose to run regionally or nationally. The national rate is $13.50 per line or $189.00 per column inch. The regional rate (Eastern, Midwestern or Western editions) is $9.00 per line or $126.00 per column inch. You can run your ad in any two regions for $11.60 per line or $162.40 per column inch. In all cases, you can earn volume discounts.

The minimum ad size is two column inches (1-1/4" wide by 2" deep) and costs $378.00 if run nationally. A sample of this size appears below. You can run larger ads in half-inch increments at $94.50 per half inch. Box numbers are available and cost $25 per insertion ($50 if foreign).

Programmer Analyst

This is a sample ad for Computerworld's Computer Careers section. It will help you decide what size ad you'd like to run. Remember that you can run your ad either regionally or nationally in our recruitment section and that the minimum ad size is one column (1-4/16 inches wide) by two inches deep (like this sample). This ad would cost $378.00 in our national edition, $252.00 in the Eastern, Midwestern, or Western edition, and $324.80 in two regions, volume discounts apply

SAMPLE AD SIZES AND PRICES: To assist you in planning your recruitment advertising, the following shows common ad sizes and their respective costs.

	One Region (East, Midwest or West)	*Two Regions (East/West East/Midwest, Midwest/West)*	*National Edition*
1 column x 2"	$ 252.00	$ 324.80	$ 378.00
2 columns x 2"	$ 504.00	$ 649.60	$ 756.00
3 columns x 3"	$1,134.00	$1,461.60	$1,701.00
4 columns x 5"	$2,520.00	$3,248.00	$3,780.00
5 columns x 7"	$4,410.00	$5,684.00	$6,615.00

PAYMENT: If you're a first-time advertiser or if you haven't established an account with us, we need your payment in advance (or with your ad) or a purchase order number. Once you have established an account with us, we'll bill you for any ads you run as long as your payment record is good.

COMPUTER CAREERS NETWORK BUYS: You can take advantage of special rates that let you run your ad in *Computerworld* and *Computerworld*'s sister newspapers at special rates. Choose from *Computerworld Focus on Integration, Network World, InfoWorld, Digital News and Federal Computer Week. Call for details.*

Computerworld Recruitment Advertising Order Form

Ad Size:_____ columns wide by _____ inches deep

Issue Date(s): _____

Name: _____

Company: _____

Address: _____

Telephone: _____

Region: ☐ East ☐ Midwest ☐ West **National:** ☐
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AGSI

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S/36 S/36

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37.5 hours per week, from 8 a.m. to 4:30 p.m. at $1,466.00 per month. Duties include to convert all existing application programs to FoxBase application programs, make smooth system changes from IBM PC AT Local Area Network to Novell network system; customize the Novell System default settings to suit individual user's needs; analyze the system and control network security; write application programs and install software packages as required. Take the responsibility of a network supervisor; document all efforts and develop a detective export system to MIS. degree in Computer Science is required. Applicants must have taken a graduate level course of Expert System using LISP or PROLOG software languages and have taken the State of Illinois Civil Service Test and ranked top three in the end score. Please send resumes to Illinois Department of Employment Security, 1936 N. Henderson, Galesburg, Illinois 61401, Attention: Larry Reed, Reference No. 9029-B, An Employer Paid Ad.

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In order to be considered qualified for the Electronics Design Engineer position, you should have experience in the design, testing, and troubleshooting of electronic microprocessor hardware and firmware for new and existing products. Familiarity with the full range of Intel micros, and the Hitachi 64180 microprocessors' functionality and design is desired. You should also be able to use development tools such as the Intel Series III and Series IV, PC based hardware development tools such as Schematic Capture and AUTOROUTER as well as other PC based Micro Development Tools. A BSEE (or equivalent experience) is necessary.

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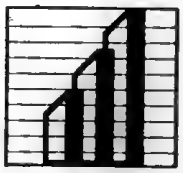

Keane Inc. is one of the nation's most respected DP consulting organization with annual revenue of $60 million. Due to our unprecedented success in the Midwest and Northeast, we are currently expanding our DP consulting operations.

Join us as a data processing consultant, and get your career on the move by developing new technical and professional skills while working at challenging client assignments. We currently have immediate openings for PROGRAMMERS and ANALYSTS in the following locations: CT, MA, MD, ME, MN, NH, NJ, NY, IL, PA.

To qualify, you must have a minimum of two years' data processing experience in COBOL, plus one or more of the following:

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CICS	DEC/VAX
DB2	WANG VS
TELON	PC's
IDMS	ASSEMBLER
S/38 AS400	ADABAS

Keane offers a professional environment, competitive salaries and a comprehensive benefits package including health/dental/life, technical and management training, tuition reimbursement, vacation condominiums and more. For more information call Deborah Pawlicki at 1-800-328-4688 or send your resume to her attention at Keane Inc., Parkview Suite 250, 10480 Little Patuxent Parkway, Columbia, MD 21044.

KEANE

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An equal opportunity employer

Temporary Position Available for Data Processing Technician and Analyst

Project consists of designing and implementing an inter-city and intra-city dispatch procedure. Integrated with existing Unix based multi-functional programs for a trucking company. Applicant must have full knowledge of Tariffs of the National Motor Freight Classification, Central States Motor Freight Bureau, Middlewest Tariff Bureau, Indiana Rate and Tariff Bureau, and Illinois Rate and Tariff Bureau. Must also have full knowledge of the U.S. D.O.T. regulations with special emphasis on hours of service. Applicant's education must include the successful completion of at least 2 years of college with a major field of study in Electrical Engineering, six months of computer programming on NCR Tower 32 Unix system, and various PC's. Experience must include 2 years of work as an Electronic Repair Technician. 40 hours per week with various times per day depending on project schedule at $12.95/hr basic and $18.38/hr overtime. An Equal Opportunity Employer. Send resumes with social security number to South Bend Freight Line, Inc., Attn: Abraham Marcus, P.O. Box 4343, South Bend, IN 46634.

Advanced Technology Advisor

At American Express in Phoenix, we depend not only on the most sophisticated systems, but on the most talented technical professionals.

Join our Advanced Technology Group in defining and developing workstations for the 1990's. This prototype design project requires an advanced knowledge of computer workstations. A BSEE or BSCS or equivalent, solid experience with "C", UNIX, and interconnect protocols to IBM mainframes are required.

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Systems Analyst to design and implement specialized database management information systems utilizing stochastic and statistical models, on IBM mainframes using DB2 and IMS DB/DC. Consult with engineering or manufacturing departments to refine definition of projects, such as just-in-time inventory control and prepare statistical simulation of system. Reduce project to computer-processable form. Master of Science in Statistics with Master level coursework which includes one course in each of Stochastic Processing and Statistical Computing, and 3 months experience as Programmer Analyst required. Salary $40,000.00 per year, 40-hour week. Send resumes to 7310 Woodward Avenue, Room 415, Detroit, Michigan 48202. Reference No. 30789. Employer paid ad.

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CAREER INDEX

Computer recruitment advertising index*

*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

SOURCE: CW PUBLISHING, INC'S RECRUITMENT MARKET RESEARCH DATABASE

CW CHART: FRANK C. O'CONNELL

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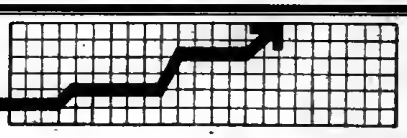

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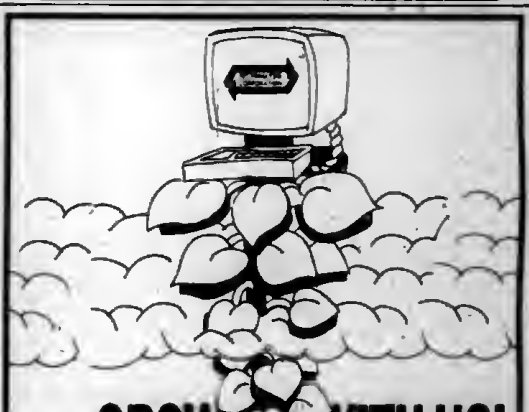

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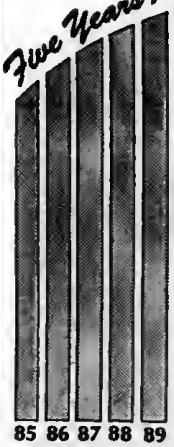

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MARKETPLACE

Stigma thwarts 9370 trading

Interest in IBM's processors in the used marketplace is almost nil

BY SUSAN GANNON
IDC FINANCIAL SERVICES CORP

In October 1986, IBM announced the 9370 midrange product family, and by the end of 1987 the entire line was shipping. When IBM announced the 9370, the manufacturer had great expectations for the machine's future. However, 2½ years later, the reality is quite different.

The secondary market for 9370s is almost nonexistent. Analysts at IDC Financial Services Corp. in Framingham, Mass., do not expect a competitive secondary market to develop because of the 9370's small installed base and the stigma surrounding the box. IBM is still trying to establish a niche for the 9370, and unless the firm miraculously turns the tide of 9370 disillusionment, there will continue to be little to no secondary market activity.

According to secondary market sources, there are lessors who have had 9370s in inventory for well over six months and have been unable to generate any interest from third parties or end users.

The lack of end-user and dealer demand for the 9370 makes it extremely difficult to determine the true value of a used box. Judging from the few asking prices reported, it appears that dealers are pricing used machines by accounting for IBM's discounts of 25% to 30% off the list price — along with a new vs. used differential.

In a market with a normal level of demand, a used 9375 Model 60, for example, should trade at a dealer-to-dealer quote of 50%. However, realistically there is no demand for these machines. Therefore, dealers are forced to drop their asking prices to account for the tarnished reputation of the 9370s.

Not so sure

When a box does become available, dealers are skeptical about bidding on it unless they have a customer looking for one. Most leasing companies are fearful that the 9370 will depreciate while sitting in a warehouse. In fact, when lessors arrange to lease a 9370, most of them assume no residual value at the expiration.

Although the road has been rocky, IBM continues to announce additional models to the 9370 product line. In less than three years, the company has replaced all of the original models except the Model 90.

Of the original models, Models 20, 40, 60 and 90, the 90 was the only machine manufactured in Germany and the only original model that utilized CMOS technology. Models 20, 40 and 60 utilized bipolar technology. CMOS technology was also used in the Models 30, 50 and 80 that IBM announced in September 1988.

By the end of 1988, the 9370 product family consisted of Models 20, 30, 40, 50, 60, 80 and 90. Models 30, 50 and 60 had the same performance ratings of 1.2 million instructions per second (MIPS), but Models 30 and 50 offered this performance at a better price. In April, IBM announced that the Model 60 was no longer in primary manufacturing, signaling the beginning of the end for the Model 60.

In April 1989, IBM announced additional enhancements to the 9370 product family. The improvements consisted of a new model — the 25 — and a performance enhancement to the Model 50. In addition, the company announced the withdrawal of Models 20 and 40 from the market.

The Model 25 is the new entry-level machine in the 9370 family. It is priced at $26,250 and will be available this month. The estimated performance rating of the Model 25 is 1.3 MIPS, approximately 2½ times more than the Model 20, which the Model 25 replaces.

> WHEN LESSORS arrange to lease a 9370, most of them assume no residual value at the expiration.

In September, IBM announced the Model 50 with an estimated performance rating of 1.2 MIPS. Last month the company announced a 25% performance boost to the machine. Customers that ordered the original Model 50 or have one installed can receive the additional performance for no charge. The enhancement will be available this month.

Competitive lineup

Now, the IBM 9370 line consists of Models 25, 30, 50, 80 and 90. This lineup offers customers a performance range of 1.2 to 2.5 MIPS and is more competitively priced than the original line.

Analysts expect IBM to announce additional high-end 9370 models by the end of the year. The new models will utilize CMOS technology and offer at least a 25% price/performance improvement over the existing high-end models. There is also room for a low-end 9370 model running at less than 1 MIPS that is scheduled to be announced sometime this summer.

Now that IBM has announced what it calls a "significant refresh to the 9370 product line," perhaps the new price/performance will stir some interest in the user and leasing communities. However, most customers will probably take a wait-and-see attitude before investing in IBM's second attempt at the 9370.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 508-872-8200.

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The BoCoEx index on used computers

Closing prices report for the week ending April 28, 1989

	Closing price	Recent high	Recent low
IBM PC Model 076	$600	$800	$450
XT Model 086	$1,050	$1,150	$900
XT Model 089	$1,250	$1,400	$950
AT Model 099	$1,625	$2,000	$1,525
AT Model 239	$1,800	$2,100	$1,775
AT Model 339	$2,000	$2,375	$1,800
PS/2 Model 60	$3,075	$3,100	$2,500
PS/2 Model 80	$3,850	$4,100	$3,100
Compaq Portable I	$600	$750	$550
Portable II	$1,900	$2,100	$1,750
Portable III	$2,700	$2,950	$2,400
Portable 286	$1,700	$1,975	$1,675
Plus	$1,000	$1,200	$900
Deskpro 286	$1,900	$2,350	$1,800
Deskpro 386	$2,750	$2,900	$2,500
Apple Macintosh 512	$575	$775	$550
512E	$775	$975	$600
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II	$4,125	$4,450	$3,425
NEC Multispeed	$700	$825	$650
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A survival guide to future shock

Anticipating change is the key to designating appropriate training

BY STEWART L. STOKES JR.
SPECIAL TO CW

"If it ain't broke, don't fix it." We're all familiar with this counsel, and most of us have probably used it more than once to justify not taking action. But carried to the extreme, it is bad advice, especially for chief information officers.

To say that the information systems environment is changing is a cliche. Few would quarrel with the suggestion that the changes going on within IS currently rival any within it before in terms of breadth, significance and speed.

One task for today's systems managers is to anticipate change to provide themselves and their people with the appropriate training. "Let's find today what may break tomorrow, and let's prepare to fix it now." Indeed, anticipating change is a survival skill — preventive maintenance applied to our careers.

What model is there for anticipating and planning for change? I suggest an "upstream-downstream" model as a practical and useful way to identify those forces that can impact the company, organization or IS department.

The notion of upstream-downstream changes was described by Leon Martel in his book *Mastering Change* (New American Library, New York, 1986). I have applied the model to changes impacting IS and find it to be effective when teaching and consulting with systems managers about problems they have when introducing and managing change.

Up and down

Upstream changes are ones that will impact what an organization does or wants to do as it carries out its vision and achieves its objectives. Downstream changes are those changes that will impact the organization's customers and perhaps in turn rebound to impact the enterprise itself.

For example, upstream changes that will impact IS departments include the following:

- Research on new technologies that will change how systems are designed and developed, thereby affecting the job security and career growth of IS professionals.
- Changes in economic conditions that will impact the work habits and patterns of the IS work force.
- Changes in global or national markets that will impact an enterprise's product line and in turn affect the portfolio of projects within an IS department.
- New technologies that encourage the growth of end-user computing, thus lessening the influence of IS within the enterprise.
- Changes in "computer competency," or what an IS department's customers know (or think they know) about systems and how they are developed and implemented, thus impacting the IS department itself.
- Changes in economic and/or educational levels that will impact the customers for IS products and services.

ANTICIPATING CHANGE is a survival skill — preventive maintenance applied to our careers.

One very specific upstream change is the mounting lack of interest among college and university students in careers in IS and the shrinking numbers of students electing computer-related majors. These upstream changes are impacting the quality of today's graduates, which in turn will impact the quality of tomorrow's systems.

Downstream changes that will impact IS departments include the following:

One very significant downstream change today is the number of users or IS customers who are in charge of systems projects. This change is a direct reflection of customers who have increased their computer competence and also may be more adept than their IS colleagues in human relations and interpersonal skills. This situation calls for IS professionals to develop skills in negotiating and managing conflict.

The next step in planning for upstream and downstream changes is to rank them in terms of how critical they are, or their significance to the enterprise, and to the mission and objectives of the IS department.

Sort out factors

There are a variety of factors to weigh to estimate the degree of significance of the changes. These factors include such variables as impact of the changes, timing, resources needed to cope with and manage the changes, costs of resources, pace and duration of the changes, experience with similar changes, expected sources and various degrees of resistance and potential champions for the changes.

CIOs have an opportunity to exercise visible leadership here, for corporate management needs to give considerable thought to these issues, and CIOs and their staffs are key players in the process.

People managing IS departments need to develop increased ability to anticipate, manage and cope with change and help their people to do likewise. Managing change has truly become a survival skill.

Stokes is a senior vice-president of QED Information Sciences, Inc. in Wellesley, Mass.

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Taiwan: Leona Wang, ACE Media Agency Co Ltd., P.O. Box 26-578, Room 5039 I, Fu Hsin, S. Road Sec 1 Taipei, Taiwan, R.O.C. Phone: (011) 886 2 721 4302. Telex: (785) 14142 (ACE GROUP). (Representative for all CWCI publications). FAX: (011) 886 2 731 0420

London, Martin Durham, CW Communications Ltd., 99 Grays Inn Rd., London, WC1 8UT, United Kingdom Phone: (011) 44 1 831 9252 Telex: (851) 262346 (THEPUB G). FAX (011) 44 1 405 2347.

United Kingdom: Euan Rose, Beans Hobson & Associates, 34 Warwick Road, Kenilworth, Warwickshire, CV8 1HE United Kingdom. Phone: (011) 44 926 512424. Telex: (851) 31 (881 (BEEHOB). (Representative for all CWCI publications). FAX: (011) 44 926 512848.

Venezuela: Kasman von Wiphs Nagy, CW Communicaciones, C.R.L. Tore Manzolillo, Piso 13, Oficina H, Av. Libertador Caracas, Venezuela. Phone: (011) 58 2 72 76 30. FAX (011) 58 2 734970.

West Germany: Edward Upadek, CW Publikationen Verlagsgesellschaft mbH, Rheinstrasse 26/28, Postfach 40 0429, 8000 Munich 40, West Germany Phone: (011) 49 89 360860 Telex: (841) 5215380. (CWmr D). FAX: (011) 89 89 3 60 86 100.

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May 29		Printers & Plotters
June 5	Special Feature: Systems Integration Executive Report: Workgroup Computing	
June 12	Technology Issues in Downsizing	
June 19		Micro DBMS
June 26	Restructuring MIS — Organizational Impact of Downsizing	

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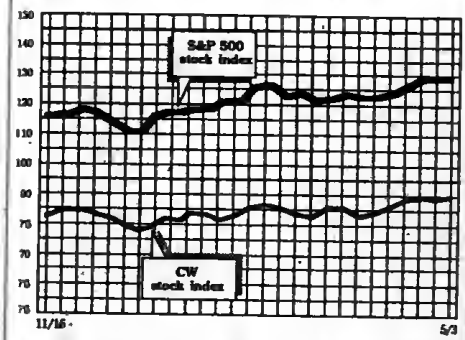

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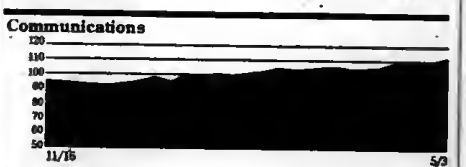
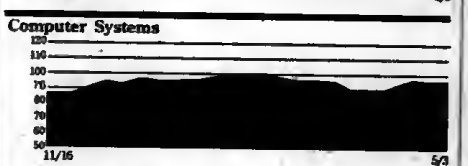
Computer Systems	95.2	95.5
Software & DP Services	119.5	121.0
Semiconductors	57.5	58.6
Peripherals & Subsystems	81.0	81.6
Leasing Companies	111.5	111.9
Composite Index	88.9	90.0
S&P 500 Index	129.3	129.8

Communications



Computer Systems



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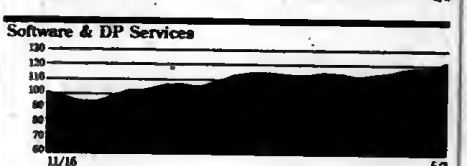
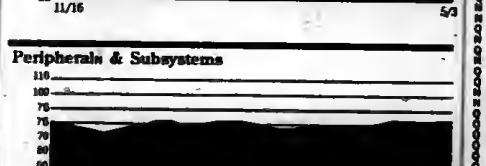


Semiconductors

Peripherals & Subsystems



Leasing Companies

CW CHARTS

Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MAY 3, 1989

Communications and Network Services

		52-WEEK RANGE (1)	CLOSE MAY 3, 1989	WEEK NET CHANGE	WEEK PCT CHANGE
N	AMERICAN INFO TECHS CORP	38 43	58.125	0.1	0.2
Q	ANDREW CORP	22 75	10.875	-0.3	-3.0
Q	ARTEL COMM CORP	6 1	4.9	0.5	24.1
N	AT&T	35 34	34.625	0.0	0.7
Q	AVANT GARDE COMP INC	0 0	0.468	0.0	11.1
Q	AVANTEK INC	9 7	8.125	0.0	-2.4
Q	AYDIN CORP	16 13	15.125	0.0	1.7
N	BELL ATLANTIC CORP	64 35	62.375	1.4	1.7
N	BELLSOUTH CORP	47 38	46.75	0.0	1.6
Q	COMPRESSION LABS INC	6 3	5.625	0.0	4.7
Q	COMPUTER NETWORK TECH	2 1	1.407	0.0	0.5
Q	COMTEL CORP	36 31	57.125	4.5	8.6
Q	DATA SWITCH CORP	8 4	4.875	0.0	0.0
Q	DIGITAL COMM ASSOC	24 17	20.875	0.1	0.6
Q	DYNATECH CORP	23 17	17.5	0.0	0.0
Q	FIBRONICS INTERNATIONAL INC	5 3	4.25	0.0	0.0
Q	GANDALF TECHNOLOGIES	6 3	5.375	0.0	10.3
Q	GENERAL DATACOMM INDS	6 3	6.125	-0.3	-4.7
N	GTE CORP	40 34	40.625	1.6	2.5
Q	INFOTRON SYS CORP	14 10	10	0.3	3.8
N	ITT CORP	36 29	59.125	1.5	2.1
N	M A COM INC	11 8	8	0.1	1.9
Q	MCI COMMUNICATIONS CORP	34 13	33.625	1.3	3.8
Q	NETWORK EQUIPMENT TECH INC	25 14	22.75	0.6	2.8
Q	NETWORK SYS CORP	12 6	6.875	-0.3	-2.7
Q	NORTHERN TELECOM LTD	20 14	17.625	0.5	0.0
Q	NOVELL INC	28 21	24.75	2.8	0.0
Q	PEC NET CORP	75 61	72.375	-0.9	-1.2
N	PACIFIC TELESIS GROUP	39 35	38.25	0.1	0.3
N	PARADYNE CORP	10 4	10.25	0.0	0.0
A	PENRIL CORP	8 4	5.375	-0.1	-2.3
N	SOUTHERN NEW ENGLAND TEL	49 39	44.5	0.0	0.0
N	SCIENTIFIC ATLANTA INC	18 10	15.75	1.1	7.7
N	SOUTHWESTERN BELL CORP	38 34	38	0.1	0.3
Q	3 COM CORP	38 75	34.625	0.5	2.1
N	U S WEST INC	36 31	64.75	0.9	1.4

Computer Systems

Q	ALLIANT COMPUTER SYS	7 3	8.75	0.9	8.9
Q	ALPHA MICROSYSTEMS	8 6	7.5	0.0	3.4
A	ALTOS COMPUTER SYS	10 6	6.375	-0.1	-1.3
Q	AMDAHL CORP	20 16	18.25	0.0	1.3
Q	APOLLO COMPUTER INC	17 7	13	0.1	1.3
Q	APPLE COMPUTER INC	35 34	45.25	0.9	1.3
Q	BOLT BERANEK & NEWMAN	10 7	7.875	0.1	1.3
Q	BRITTON LEE INC	4 2	2.562	-0.3	-8.9
N	COMPAQ COMPUTER CORP	82 47	76.875	-0.5	-1.1
Q	COMPUTER AUTOMATION INC	11 3	4.75	0.1	2.7
Q	CONCURRENT COMP CORP	8 4	4.75	0.4	0.0
Q	CONTROL DATA CORP	35 16	20.25	0.4	1.5
Q	CONVEX COMPUTER CORP	11 7	11.25	0.0	2.3
Q	CRAY RESH INC	85 48	48.625	-0.9	-1.5
Q	DAISY SYS CORP	12 4	4.125	-0.4	-8.3
N	DATA GEN CORP	38 14	17.5	0.0	0.0
Q	DATAPOINT CORP	6 4	5.75	0.1	1.2
Q	DELL COMPUTER CORP	13 7	7.75	-0.1	-1.5
N	DIGITAL EQUIP CORP	122 86	98.625	1.1	1.2
N	FLOATING POINT SYS INC	4 2	2.75	0.0	0.0
N	HARRIS CORP	34 23	26.25	0.1	0.4
N	HEWLETT PACKARD CO	64 44	56.875	-0.1	-0.2
N	HONEYWELL INC	77 57	75.75	4.0	3.8
N	IBM	131 106	111.5	-3.0	-2.6
Q	INFORMATION INTL INC	30 13	13.375	0.0	3.8
Q	IPL SYS INC	7 1	6	0.1	2.1
N	MAI BASIC FOUR INC	61 7	7	-1.5	-8.3
N	MATSUSHITA ELEC IND'L LTD	210 130	178.875	1.3	1.1
Q	MEGADATA CORP	3 1	1.313	0.0	0.0
Q	MENTOR GRAPHICS CORP	35 23	34.25	-1.3	-2.7
N	NBI INC	6 1	2.375	0.1	6.5
N	NCR CORP	70 61	67.75	1.3	3.4
N	PRIME COMPUTER INC	21 19	19.875	-0.3	-1.5
Q	PYRAMID TECHNOLOGY	30 11	12.75	-0.5	-3.3
Q	SILICON GRAPHICS CORP	35 14	18.5	0.3	1.5
Q	STRATUS COMPUTER	32 21	30	0.9	2.9
Q	SUN MICROSYSTEMS INC	31 19	17.125	-0.5	-2.8
Q	SYMBOLICS INC	6 1	2.25	0.9	12.5
Q	SEQUENT COMPUTER SYS INC	28 14	25.25	-1.0	-3.8
N	TANDEM COMPUTERS INC	21 12	16.625	-0.3	-1.5
N	TANDY CORP	49 38	43.5	-1.3	-2.8
N	ULTIMATE CORP	15 6	8.875	0.5	2.8
N	UNISYS CORP	39 25	25	-0.9	-3.5
A	WANG LABS INC	12 7	7.75	0.0	0.0

Software & DP Services

Q	ADVANCED COMP TECH	4 1	2.375	-0.3	-11.6
N	AMERICAN MGMT SYS INC	19 12	14	-0.1	-0.9
Q	AMERICAN SOFTWARE INC	24 12	23.125	-0.3	-2.1
Q	ANACOMP INC	13 6	6.0	-0.1	-1.6
Q	ANALYSTS INTL CORP	19 6	18.5	-0.3	-1.3
Q	ASHTON TATE	28 19	20.625	0.0	1.3
Q	ASK COMPUTER SYS INC	75 12	14.875	-0.4	-2.5
Q	AUTODESK INC	37 23	28.75	0.0	0.2
N	AUTO DATA PROCESSING	33 25	28	-0.1	-0.3
Q	BMC SOFTWARE INC	20 6	18.75	1.3	0.0
Q	BOOLE & BABBAGE INC	25 6	18.75	0.5	1.4
Q	BUSINESSLAND INC	19 6	11.875	-0.3	-2.1
N	COMPUTER ASSOC INTL INC	35 34	37.5	0.0	0.0
Q	COMPUTER HORIZONS CORP	13 7	9.25	0.0	2.1
Q	COMPUTER SCIENCES CORP	35 26	30.75	-1.3	-3.9
Q	CORPORATE SOFTWARE	19 6	12.25	0.0	1.2
Q	COMPUTER TASK GROUP INC	17 15	14.5	0.0	4.9
Q	COGNOS INC	9 6	7.375	-0.1	-0.3
Q	COMSHARE INC	29 16	26.5	1.5	2.9
Q	CULLINET SOFTWARE INC	9 4	8.125	-0.3	-14.0
N	GENERAL MTRS (CLS E)	49 37	48.625	0.0	1.3
Q	HOGAN SYS INC	7 6	6.25	-0.3	-7.4
Q	INFORMIX CORP	26 7	10.25	-1.1	-9.8
Q	INTELLICORP INC	4 2	4.25	0.0	0.0
Q	KEANE INC	35 11	28.75	1.3	3.9
Q	LEGENT CORP	25 16	24.25	-0.4	-1.5
Q	LOTUS DEV CORP	25 16	21.875	0.4	1.7
Q	MANAGEMENT SCI AMER	14 6	11	0.1	1.1
Q	MICRO PRO INTL CORP	4 2	2.063	-0.1	-5.3
Q	MICROSOFT CORP	71 35	54	0.0	0.0
Q	NATIONAL DATA CORP	75 19	39.25	-1.3	-4.2
Q	ON LINE SOFTWARE INTL INC	16 6	6.875	0.6	10.0
Q	ORACLE SYS CORP	28 15	26.5	-1.3	-4.6
Q	PANSOPHIC SYS INC	18 12	17.25	0.0	0.0
Q	PHOENIX TECHNOLOGIES INC	75 12	16.0	1.3	10.0
Q	POLICY MGMT SYS CORP	38 21	38	2.1	8.2
Q	PROGRAMMING & SYS INC	75 10	10	0.0	0.0
Q	RABBIT SOFTWARE INC	6 2	1.688	0.0	0.0
Q	RELATIONAL TECHNOLOGY INC	21 20	10.625	-0.3	-2.3
N	REYNOLDS & REYNOLDS CO	75 17	20.875	0.1	0.4
Q	SEI CORP	23 75	15.25	-0.9	-5.7
Q	SHARED MED SYS CORP	34 14	16.5	0.1	0.7
Q	SAGE SOFTWARE INC	10 6	8.125	0.0	0.0
Q	SOFTWARE PUBN CORP	27 75	24.125	1.1	4.9
A	STERLING SOFTWARE INC	6 5	5.5	1.0	18.2
Q	SUNGARD DATA SYS INC	30 13	13.5	0.0	0.0
Q	SYSTEMATICS INC	37 25	25.25	-0.3	-1.2
N	SYSTEM CENTER INC	31 13	16.75	-0.3	-1.8
N	SYS. SOFT INC	35 6	31.75	-0.3	-1.2

Semiconductors

N	ADV MICRO DEVICES INC	17 7	8.875	0.0	0.0
N	ANALOG DEVICES INC	28 75	11.25	-0.1	-1.1
Q	ANALOGIC CORP	75 6	6.875	-0.4	-5.9
Q	CHIPS & TECHNOLOGIES INC	20 11	16	1.3	8.8
Q	INTEL CORP	37 15	28.5	1.3	4.4
Q	LSI LOGIC CORP	14 9	11.5	0.0	4.6
Q	MICRON TECHNOLOGY INC	25 19	22.375	2.8	14.7
N	MOTOROLA INC	55 36	45.25	-0.9	-1.9
Q	NATL SEMICONDUCTOR	10 7	7.75	-0.3	-3.1
N	TEXAS INSTRS INC	61 38	38.875	0.0	0.0
A	WESTERN DIGITAL CORP	17 11	11.625	-0.3	-2.1

Peripherals

N	ALLOY COMP	4 0	3	-0.1	-3.1
Q	AM INTL INC	6 4	4	0.0	0.0
Q	AST RESH INC	17 7	8	-0.1	-1.2
Q	AUTO TROL TECH CORP	6 4	4.875	0.1	2.5
Q	BANCTEC INC	14 6	12.5	0.1	1.5
Q	CIPHER DATA PRODS INC	11 6	9.875	0.0	2.5
A	COGNITRONICS CORP	6 3	4	0.1	3.2
Q	CONNER PERIPHERALS	11 7	10.375	0.5	5.1
A	DATAPRODUCTS CORP	16 6	16.875	-0.3	-1.5
Q	DATARAM CORP	6 3	5.125	-0.1	-1.9
N	EASTMAN KODAK CO	30 30	43.375	-0.1	-0.2
Q	E M C CORP MASS	10 6	5.5	-0.3	-5.7
Q	EMULEX CORP	13 6	11.125	0.0	2.3
Q	EVANS & SUTHERLAND	20 13	19	-0.5	-2.7
Q	IDOT CORP	4 2	3.625	0.1	3.0
Q	INTERLEAF INC	17 6	8.625	-1.3	-10.4
Q	KOMEGA CORP	5 3	2.875	0.4	17.3
Q	LEE DATA CORP	4 2	2.688	-0.1	-3.5
Q	MAGNETOR SYS CORP	4 2	2.5	-0.1	-3.7
Q	MAXTOR CORP	75 6	10.25	0.1	1.3
Q	MICROPOLIS CORP	25 6	6.5	-0.1	-1.5
Q	MINISCRIBE CORP	14 6	3.625	-0.1	-3.3
N	MINNESOTA MNG & MFG CO	73 57	72.375	1.5	2.1
Q	PERSONAL COMPUTER PRODUCTS INC	7 4	4.375	-0.3	-6.4
Q	PRIAM CORP	8 1	0.625	-0.1	-16.7
Q	PYRAMID INC	11 7	7	0.9	3.7
Q	QMS INC	11 6	7.625	-0.4	-4.7
Q	QUANTUM CORP	21 10	20.5	2.4	13.1
N	RECOGNITION EQUIP INC	12 6	8.5	0.1	1.3
Q	REXON INC	8 4	5.75	0.5	3.8
N	SEAGATE TECHNOLOGY	26 7	13.5	-0.4	-2.7
Q	STORAGE TECH CORP	4 1	1.75	0.1	7.7
Q	TANDON CORP	3 1	0.813	0.0	0.0
N	TEKTRONIX INC	27 19	22.25	-0.3	-1.1
Q	TELEVIDEO SYS INC	1 0	0.875	0.0	0.0
N	XEROX CORP	35 30	65.25	-1.4	-2.1

Leasing Companies

Q	AMPLICON INC	119 75	14.75	-0.3	-4.1
N	CAPITAL ASSOCIATES INTER-NATIONAL INC	6 4	7.875	-0.3	-2.1
N	COMDISCO INC	35 75	34.25	0.0	0.0
Q	CONTINENTAL INFO SYS	0 0	0.688	-0.1	-8.3
Q	LDI CORPORATION	17 10	14.75	-0.3	-1.7
Q	PHOENIX AMERN INC	6 3	3.125	0.3	8.7
Q	SELECTERM INC	6 4	6	0.0	0.7

EXCHANGE—N=NEW YORK; A=AMERICAN; Q=NATIONAL

No waiting

Wang is latest tech firm to profit from rampant takeover rumors

After months during which Wang Laboratories, Inc. was yesterday's news, suddenly The Doctor is in. Wang's stock traded heavily last week on rumors that Xerox Corp. is eyeing it as a good hedge against the raiders said to be sniffing around its own door. Wang Class B and Class C stock closed Thursday at 8⅝ and 8½, respectively, each up ⅜ of a point. Xerox closed at 65¼, down 2⅛ points.

Continuing takeover rumors and speculation produced a blizzard of activity in Cullinet Software, Inc. stock. Already roused from its recent stupor last week as acquisition rumors added ½ of a point, Cullinet climbed 1⅜ points higher to a Thursday close of 6¾.

Prime Computer, Inc., still fighting for its corporate life in the face of a hostile takeover bid, slipped ⅜ of a point to 18½.

Sun Microsystems, Inc. announced impressive quarterly earnings but cautioned that parts shortages for new products could dim the next quarter's prospects. Its stock closed Thursday at 16¾, down ⅜ of a point. Digital Equipment Corp. stock, battered a bit recently, showed signs of renewed vigor as it gained 1⅜ points to close Thursday at 97. IBM dropped 3⅛ points to close at 110⅛.

NELL MARGOLIS

IBM turns to filling voice/data needs

BY ELLIS BOOKER
CW STAFF

DALLAS — Citing strong customer demand for integrated voice and data, IBM last week announced a suite of communications products at the International Communications Association show here, topped by a foray into integrated applications for its host computers and private branch exchanges (PBX).

Callpath, an interface jointly developed by IBM and its subsidiary Rolm Systems, integrates the IBM 9751 computerized branch exchange with IBM 370 hosts running CICS.

Callpath will require little modification of the applications on CICS hosts, making it an attractive option for CICS users who wish to integrate their existing telephony applications, said Frank J. Elliott, IBM's director of communication systems, U.S. marketing and services.

IBM's reasons for introducing Callpath may have as much to do with signaling that it is still interested in intelligent networking as with answering market needs.

"IBM is clearly searching for synergy [for telecommunications products]," Nikko Securities analyst Michael Geran said. "There is clearly business pressure to generate business applications, and this is one of many approaches."

However, Gigi Wang, an analyst at The Yankee Group, said she was disappointed that Callpath did not support automatic number identification, a signaling feature of Integrated Services Digital Network (ISDN) that delivers the calling party's number to the called party.

IBM also unwrapped models of its 3745 communications controller that support fractional T1 service and offer 1.6 times better performance than the line's 3725 predecessor.

The new models — the 130, 150 and 170 — and upgrades to the existing 210 and 410 models appear to be a direct bid against NCR Comten, which last month announced a line of front-end processors for IBM Systems Network Architecture (SNA) networks and claimed to outperform IBM's 3745.

By December, IBM said, Models 410 and 210 will be able to connect up to 896 lines and support fractional T1 service, line interface and Token-Ring port swapping, concurrent upgrade and IBM Personal System/2 console attachment.

Users contacted about the 3745's fractional T1 support said the feature gave them more than their data communications needed at the moment, given that they were using T1 circuits mostly for voice traffic.

"Fractional T1 would be of limited use to us — we're using only four, maybe five channels for data," said Dick Porter, manager of technical support at Alergan, Inc., a pharmaceutical firm in Irvine, Calif.

Wipeout

Nine new models of the 3174 establishment controller were also introduced, replacing all previous models. The controllers will offer a wider range of communications options and now provide multiple concurrent host connections and more flexibility for configuring SNA networks.

Four models are designed for large users and connect up to 32 IBM 3270 devices and 24 ASCII terminals. Three intermediate models support 16 3270 devices and eight ASCII devices, and two small models can connect up to eight terminals and workstations to an SNA network.

It seems likely that Callpath is IBM's response to Digital Equipment Corp.'s Computer Integrated Telephony (CIT), a strategy for integrating DEC's VAX hosts to PBXs.

When asked if Callpath is IBM's version of CIT, Elliott said, "CIT is a high-level architecture interface. Callpath is an applications interface."

CIT, announced by DEC last year, already has a head start among PBX vendors and in the international standards arena. DEC has CIT applications support for PBXs from Northern Telecom, Inc. and British Telecom. The firm lists another six PBX vendors that it says are backing the CIT concept.

Due in December, Callpath 9750 will be priced at $25,000, and Callpath Host will cost $81,000.

MCI building bridge to ISDN

As expected, MCI Communications Corp. last week specified its plan for providing ISDN and said it will roll out a bridge offering this fall that lets users get ISDN-like services without exchanging their existing equipment.

At the International Communications Association show in Dallas, MCI said it would begin rolling out true ISDN services in the first quarter of next year. But as an interim step, the carrier said it would offer "ISDN-equivalent" services based on in-band signaling. Out-of-band signaling, which establishes separate communication paths for the call itself and the signals that route calls, is a distinguishing feature of ISDN.

The three announced ISDN-equivalent services are MCI 800 Enhanced Services Package (ESP), MCI Digital Reconfiguration Service (DRS) and MCI Two-Way Access, which will let customers route inbound and outbound service over the same lines.

DRS, due in August, will let customers reconfigure "within a few minutes" their TDS 1.5M bit/sec. or 56K bit/sec. services and the way these are routed through MCI's network, said Kevin Sharer, MCI's senior vice-president of sales and marketing.

The equivalent services will protect the installed equipment investments of customers and give them a choice and a chance to evaluate ISDN's potential, Sharer said.

Interestingly, MCI said 800 ESP can offer the automatic number identification feature normally associated with ISDN. Users of ESP, Sharer said, will receive the calling party's telephone number immediately prior to the inbound 800-number call. He said this will make MCI the only long-distance carrier to provide calling-number identification using in-band signaling.

Playing with bandwidth

Future enhancements of DRS, which is going into beta testing later this year, will include on-demand bandwidth allocation or dynamic allocation of bandwidth, which will let customers configure their networks in 64K bit/sec. increments up to multiple DS-1 T1 channels.

MCI's two standard ISDN offerings expected next year are ISDN PRI, a Primary Rate Interface service, and MCI ISDN B-Channel Control, which allows customers to reconfigure their network services on demand.

MCI said it was conducting ISDN trials with Northern Telecom, Inc. and Rockwell International Corp. It said Northern Telecom was in the final phase of modifying its SL-1 and SL-100 private branch exchanges to take advantage of the in-band delivery of the calling party's phone number. Rockwell's Switching Systems Division was likewise working on changes in its Galaxy automatic call distributor, it said.

ELLIS BOOKER

Fraction of a fraction

Fractional T1 services, which allow users to pay for increments of a 1.5M bit/sec. T1 line without having to purchase the entire line, found more fans last week. Within hours of each other, MCI Communications Corp. and U.S. Sprint Communications Co. announced their intent to offer their own fractional T1 service, though neither company announced pricing.

Meanwhile, IBM added fractional T1 support to its 3745 communications controller line (see story above).

The Sprint and MCI announcements that were made at the International Communications Association show in Dallas came on the heels of AT&T's announcement two weeks ago that it would offer fractional T1 as a new Accunet service [CW, May 1].

MCI said its fractional T1 offering, which is scheduled to be formally introduced later in the year, will provide increments of 56K bit/sec. up to the full 1.5M bit/sec. capacity of a T1 line. MCI also disclosed that it has conducted a fractional T1 test using IBM's 3745 controller.

Sprint said its fractional service will be out in September. Users will choose 112K bit/sec. or 224K bit/sec. channels and build to T1 bandwidth in increments of 56K bit/sec.

ELLIS BOOKER

DEC goes WAN route in Stratacom agreement

BY ELLIS BOOKER
CW STAFF

DALLAS — Adding a key wide-area network (WAN) component to its enterprise networking strategy, Digital Equipment Corp. signed a marketing agreement last week with Stratacom, Inc., maker of a line of T1 multiplexers that use fast-packet technology.

Under the nonexclusive, no-cash deal between DEC and Campbell, Calif.-based Stratacom, both companies will sell Stratacom's line of Integrated Packet Exchange (IPX) Bandwidth Management System multiplexers in the U.S. The IPX can integrate voice, data, video and image over high-speed private lines. However, DEC will be the point of contact for service and maintenance, through its Vendor Equipment Services Group.

William S. Mitchell, manager of DEC's WAN marketing, networks and communications group, said DEC had elected to join with an outside company rather than produce its own multiplexers because of "timeliness to market and expertise issues." He would not comment, however, on whether Stratacom and DEC plan future integration of their product lines.

Speculation about DEC's intentions regarding T1 has been running high. Under its Enterprise Management Architecture program, the company currently has relationships with two other T1 multiplexer makers: Digital Communications Associates, Inc. in Alpharetta, Ga., and Timeplex, Inc. in Woodcliff Lake, N.J. DEC is said to be developing network management systems with both vendors.

Interesting relationship

The Stratacom deal also underlines DEC's tendency to engage in "strategic partnerships" with — rather than outright acquisitions of — complementary technology companies. Meanwhile, DEC is keeping its T1 options open and, in the case of Stratacom, says it plans to recommend the vendor's equipment to customers but will not force users to buy it. The computer maker will continue to support multiplexers from other vendors, DEC officials said.

W. R. Stensrud, marketing vice-president at Stratacom, argued that fast-packet technology will win over the circuit-switched approach typically used on private networks.

"Look at the type of traffic you have on WANs," Stensrud said. "Two years ago, it was dominated by voice, growing at 5% a year, while data is growing at 40%." In addition, he said, the type of data carried on WANs is changing, with increasing amounts represented by LAN-to-LAN or host-to-host traffic.

Northern Telecom to link net managers

BY ELISABETH HORWITT
CW STAFF

RICHARDSON, Texas — Northern Telecom, Inc. plans to announce by year's end a strategy to bring its two major connectivity platforms under one integrated network management system, *Computerworld* has learned.

Northern Telecom needs that integration to catch up with the other major networking and host vendors, which are one to three years ahead in their efforts to meet the burgeoning demand for enterprisewide, multivendor network management, said Frank Barbetta, an editor at Probe Research, Inc. in Morristown, N.J.

"When you're selling a system to manage everybody, you've logically got to get all your own ducks in order first; that's what IBM, AT&T and DEC are all doing," he said.

Like most of its rivals, Northern will implement an Open Systems Interconnect (OSI) model in which different network management elements will control different network domains and communicate as peers using OSI Common Management Information Protocol, said Ian Sugarbroad, Northern's director of networks technology. Those elements will include other vendors' management systems as well as the management systems for Northern's two overlapping yet complementary connectivity platforms, Sugarbroad added.

While one platform specializes in data and the other specializes in telecommunications devices, both platforms manage Northern's private branch exchanges (PBX), and both already support major industry standards such as OSI and Integrated Services Digital Network, Sugarbroad said (see chart).

One platform, Meridian Data Networking System (DNS), is meant to "manage data sessions from end to end" and provide high-speed intersite connections for hosts, workstations and local-area networks, Sugarbroad said. Announced last spring, DNS is still finding its audience.

For instance, one of the platform's original beta-test users, Delmarva Power & Light Co., had hoped the product would boost connection speeds between IBM hosts and IBM 3274 cluster controllers, eliminating the need for an upgrade to an IBM 3725 front-end processor. But DNS' 56K bit/sec. links resulted in no visible improvement, said Bruce Yearsley, network operations analyst at the Newark, Del., utility. Northern has since announced 1.5M bit/sec. T1 links for DNS, but it was too late to keep Delmarva.

Northern's other platform, Customer Defined Networking, is a key element of the strategy to provide Fortune 200 companies with easy connectivity and migration among its customer-premises and carrier-based switches, Sugarbroad indicated.

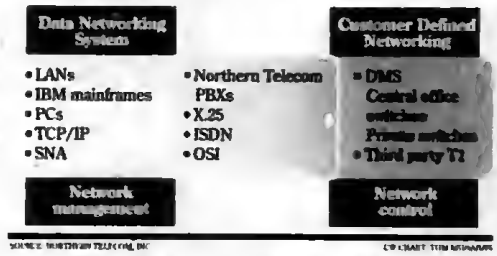
Under the huge contract the company signed with MCI Communications Corp. last week (see story page 14), Westinghouse Electric Corp.'s Westinghouse Communications subsidiary will use all MCI lines for its network backbone and replace AT&T System 85 PBXs with Northern Telecom's DMS 250 switches, said Executive Vice-President David Edison. Westinghouse liked the way various switches in the Customer Defined Networking family "play together" — in particular, the way DMS 250s on the company's premises can talk easily to DMS switches on carrier premises, Edison said.

Only last week, Northern Telecom announced Network Control, the overall network management system for Customer Defined Networking. Its appearance fills an important gap in Northern's vaunted "openness" strategy because it is said to support OSI-based links to other vendors' network management systems. Digital Communications Associates, Inc. was the first vendor to announce such a link earlier this year.

If Northern's plans bear fruit, users such as Westinghouse will be able to extend their Customer Defined Networking telecommunications management to computers, LANs and other data-oriented systems as well as to other vendors' networking equipment, Sugarbroad said.

Moving toward the middle

Northern Telecom's two network management systems have some overlap but are not yet integrated



SOURCE: NORTHERN TELECOM, INC.
CW CHART: TOM MORGAN

3Com demonstrates OSI stacks

BY PATRICIA KEEFE
CW STAFF

SANTA CLARA, Calif.— Users of OS/2 LAN Manager work groups may gain access to Open Systems Interconnect (OSI) protocols as early as September.

3Com Corp. demonstrated a full seven-layer OSI stack running under LAN Manager last week. The firm hopes to set the standard for expertise and products at both the local-area and enterprisewide network levels.

However, the addition of OSI support is not expected to significantly add to 3Com's coffers anytime soon. OSI will likely remain closeted as little more than a strategic consideration for most users for the next year or two. What is needed, analysts said, are host OSI stacks and compatible applications.

The base code for OSI support will be delivered to 3Com development partner Microsoft Corp. within two months for incorporation into the LAN Manager product it licenses to OEMs. Microsoft is targeting year-end delivery, estimated Jay Misra, a 3Com 3+Open product manager.

3Com users will not see OSI in the next version of 3+Open but should see it in a follow-up version shipping in early fall.

OSI support, coupled with Microsoft's announcement of an OS/2-to-IBM host gateway server, assures OS/2 users that by year's end they will be able to communicate with host systems and standards-based enterprisewide networks — assuming that both vendors follow through on their commitments.

3Com demonstrated OSI applications on a network featuring terminal-to-host links as well as host-generated displays on two terminals. Demonstrations of host-based file editing and two traffic-intensive programs were executed with no delays in response time, 3Com claimed. Support for two OSI protocols — FTAM and Virtual Terminal support — was highlighted.

The OSI stack will be supported and accessed under 3Com's recently announced Demand Protocol Architecture (DPA). DPA reportedly will provide users with specific protocol stacks on demand — that is, OSI or Transmission Control Protocol/Internet Protocol (TCP/IP). For example, a TCP/IP user will be able to load an OSI stack and run related applications without having to abandon TCP/IP, Misra claimed.

Netware 386 said to come close to minicomputer speed

BY PATRICIA KEEFE
CW STAFF

SAN FRANCISCO — "Netware for the '90s" debuts at the Palace of Fine Arts here today, where sources say Novell, Inc. will paint a robust picture of the long-awaited Netware 386. The 32-bit network software will run over both Intel Corp. 80386 and 486 systems, eventually offering up to 10 times the performance of its predecessor and support for up to 1,000 users.

"It's definitely a screamer," two sources said independently. The server capability announced is expected to take local-area networks up the ladder to compete in terms of capacity with minis and superminis.

Novell will detail a two-year release strategy for Netware 386 and outline plans for various product announcements throughout 1990, said sources briefed by the firm. Licensees of Portable Netware, a Unix port that requires Netware 386, are slated to attend along with providers of various 386 servers.

A single Netware 386 server will be demonstrated supporting 250 users located on four LANs, including two DOS, an Apple Computer, Inc. Appletalk and an OS/2 LAN, according to industry sources.

Netware 386 will be released in two stages: Netware 3.0 will ship in the third quarter along with a tool kit for Netware 3.1, which will ship in early 1990.

Sources said Netware 3.0 will include vastly improved performance, security and disk capacity; virtually "unlimited" numbers of files and volume sizes; use of the 386's virtual 8086 mode to eliminate the 640K-byte partition for applications; reduced system overhead; and more built-in services.

A modular approach will allow Novell to mimic 3Com Corp.'s recently announced Demand Protocol Architecture, which lets users drop in and out of specific protocol stacks as needed, sources said. This will eliminate the need to dedicate a personal computer to each gateway.

Netware 3.1 will feature a communications server, the ability to support multiple protocol stacks and support for OS/2 LAN Manager's Named Pipes interprocess communication protocol on the server — the latter a significant reversal in strategy, said one analyst.

The long overdue and much-talked-about global naming facility, which is expected to resemble Banyan Systems, Inc.'s Streettalk, will ship as an upgrade to 3.1 at the end of 1990, a source said. Also on tap is an X.400 mail gateway that supports Novell's Message Handling System mail protocol.

Second-class postage paid at Framingham, Mass., and additional mailing offices.
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TRENDS

Dbase decisions

Ashton-Tate Corp.'s Dbase may still be the dominant personal computer database management system product, but upgrading to the latest version will be slow going, according to an exclusive *Computerworld* survey of 190 high-level MIS professionals.

Dbase, which nabbed a quick market lead earlier this decade, still holds the lion's share of PC DBMS installations. In fact, 69% of the respondents used Dbase.

However, less than half of the sites queried plan to use Dbase IV, a version aimed at MIS that adds support for SQL, menu-driven applications development and greater performance.

While SQL support is critical for those seeking to effectively share data with a wide variety of relational products, most Dbase IV fans (62%) said they will buy the product largely on the basis of improved performance. The SQL component has been criticized for not being fully integrated with the rest of Dbase, its current inability to work with SQL back-end products, performance problems caused by language translation and a tendency to provide incorrect results on some queries.

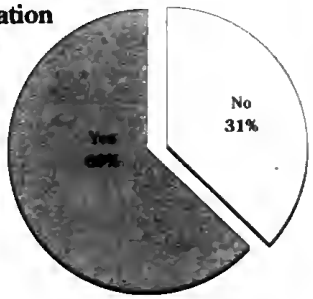
Unlike spreadsheets and word processing packages, which most firms have in abundance on PCs, database software has attained less than full penetration. Among 53 sites not using Dbase, 26% said they simply have no need. Another 9% have no need for a high-powered PC DBMS, which appears to explain the continuing popularity of simple flat-file managers.

One of the largest competitors looming on the Ashton-Tate horizon is Oracle Corp., which has been aggressively moving its minicomputer- and mainframe-based system to the PC environment. Although Oracle had virtually no market presence several years ago, 21% of the sites surveyed plan to increase the use of Oracle during the next two years. Already, 16% of the sites use Oracle.

Oracle's strength illustrates a trend toward implementing mainframe-style DBMSs, with their multiuser capabilities and data integrity, on PCs. Ashton-Tate, recognizing this trend, recently began shipping the Ashton-Tate/Microsoft Corp. SQL Server and plans to ship an SQL Server-compliant version of Dbase this summer. At this point, 13% of those surveyed plan to use SQL Server.

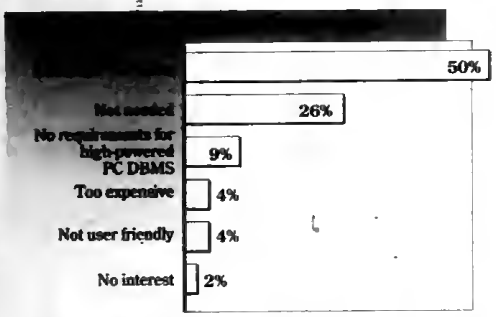
DOUGLAS BARNEY

Is your organization currently using Ashton-Tate's Dbase?

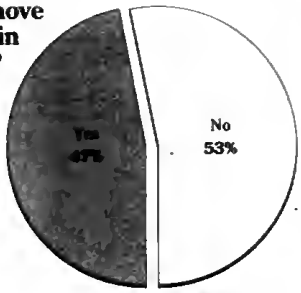


Percent of respondents
(base of 189)

If not, why?

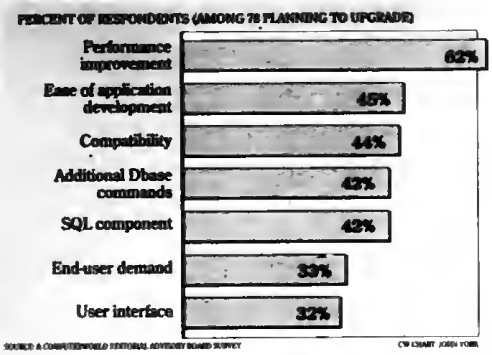


Do you plan to move to Dbase IV within the next 2 years?



Percent of respondents
(base of 170)

If so, why?



INSIDE LINES

Ask for whom the bell tolls. Beleagured Wang Laboratories was awash in rumors last week that ranged from an acquisition by Xerox to large layoffs. In response to reports that 1,500 to 2,000 employees were being cut, Wang spokesmen would only say such measures had not been taken as of Friday. One spokesman said the company will not publicly announce layoffs of fewer than 500. In compliance with a Massachusetts law requiring advance notice of rights prior to a layoff, the company did send out severance information to employees, the company confirmed. Meanwhile, an internal source said he had been told that the number of sales offices would be cut by one-third and that a number of manufacturing workers were laid off last week; spokesmen declined to comment. Wall Street rumors on Friday had Wang selling its VS line to Xerox, keeping only its personal computer and imaging business and selling off the remainder of the company.

Partly Sun-ny. Sun Microsystems' much-ballyhooed Sunwrite program has run into snags just two weeks after shipping. Sunwrite is one of the first Sun products to be licensed per CPU, but angry users complain that the firm has been unable to issue the passwords needed to enable the software. Apparently, the new software is getting confused with the beta-test version of the passwords, so the program can be displayed on a screen but can't be saved.

Write if you get work. Robert T. Morris Jr., the computer science grad student who was fingered as the alleged progenitor of the worm that clogged computers on Internet last November, has reportedly been applying his computer skills in a temporary job at a nonprofit foundation in Washington, D.C. Friends of the family helped Morris get the job, and his employers are aware of his alleged role in what has become one of the most publicized computer-related crimes ever, according to a source. Meanwhile, U.S. Justice Department officials, who have steadfastly refused to comment about the case, are reportedly no closer to deciding what charges — if any — to file against Morris, the source said.

DEC of all trades. DEC is expected to announce a program this week under which it will install, service and support personal computers, software applications and operating systems from a variety of third-party vendors. Sources say installation of a computer and operating system will cost around $100, while an additional $75 will be tacked on for each layered product. A telephone Help line will assist befuddled customers.

Yet another IBM Netview/PC bypasser. Codex is expected this week to announce Dualview, which is software said to allow its leased-line modems to act like IBM modems and communicate directly with IBM's Netview-based modem management system, LPDA2.

Back on the horse. Former Computer Dealers and Lessors Association Chairman Robert A. Gulko, whose leasing firm went out of business last year, has a new job. He is now president of LDI Equities in Larkspur, Calif., a newly formed subsidiary of Cleveland-based lessor LDI Corp. Gulko was the founder and chief executive officer of Sausalito, Calif.-based Unicom Computer, which was liquidated last year after a major customer, Fireman's Fund Insurance, failed to renew a large lease.

AT&T steals a march in the PBX-host war. While IBM's Rolm Systems debated with the DEC-Northern Telecom contingent at last week's ICA show about whose computer-to-PBX interface was the smartest, AT&T quietly announced ISDN Gateway and Integrated Telemarketing Gateway — software tools said to facilitate development of applications that allow its PBXs to automatically access a variety of host database environments.

The reaction to cold fusion claims seems reminiscent of how the mainframe industry first responded to the PC. If you see a revolution brewing in the computer industry, upload the info to our bulletin board at 508-626-0214, -0235 or -0165. Or you can always get News Editor Pete Bartolik on the phone by calling 800-343-6474 or 508-879-0700.

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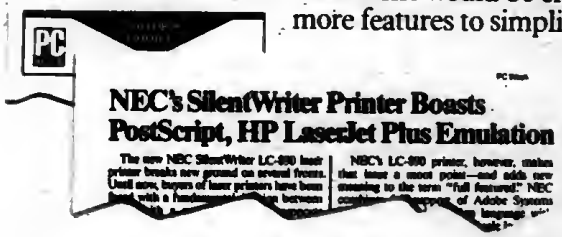
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